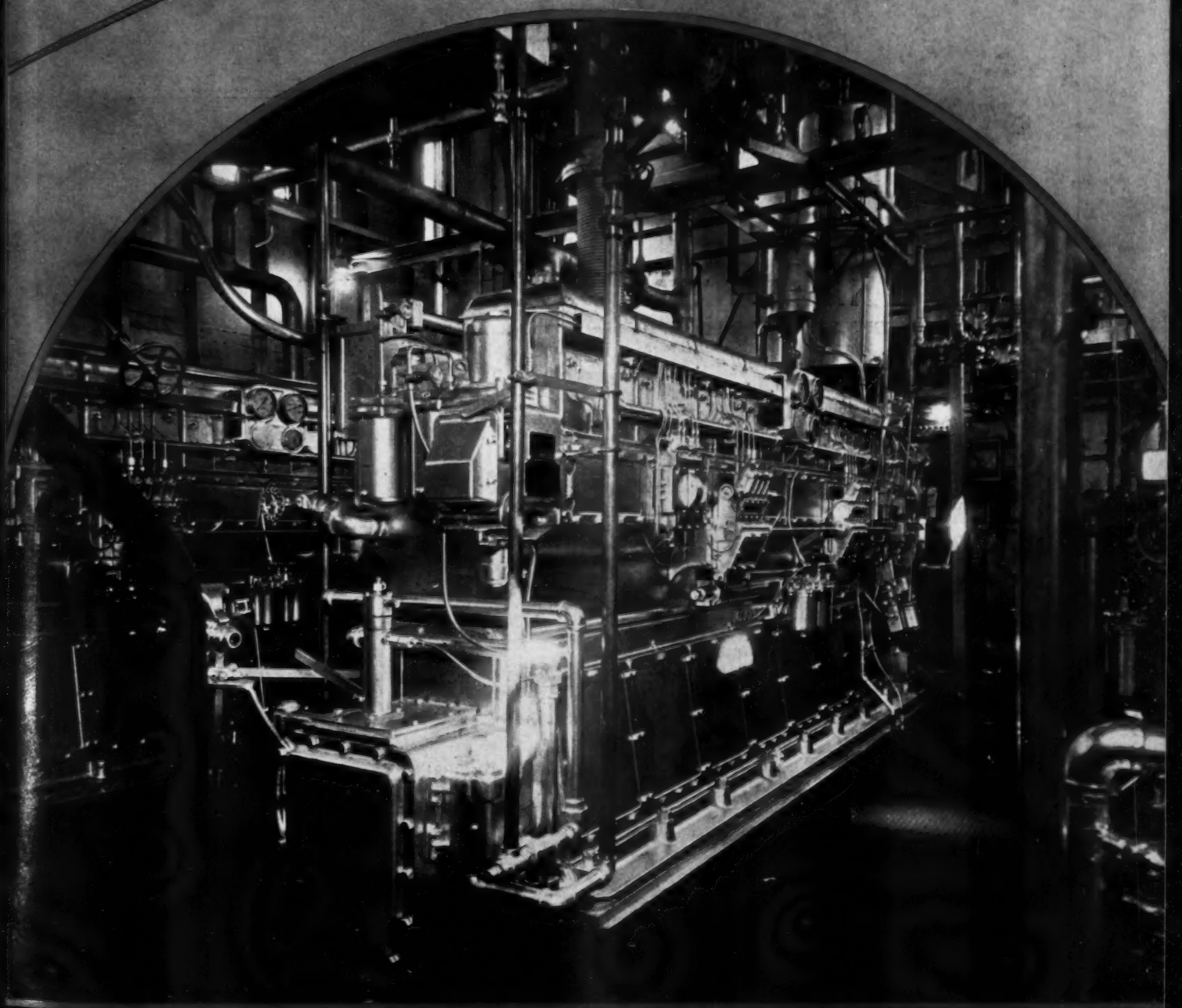
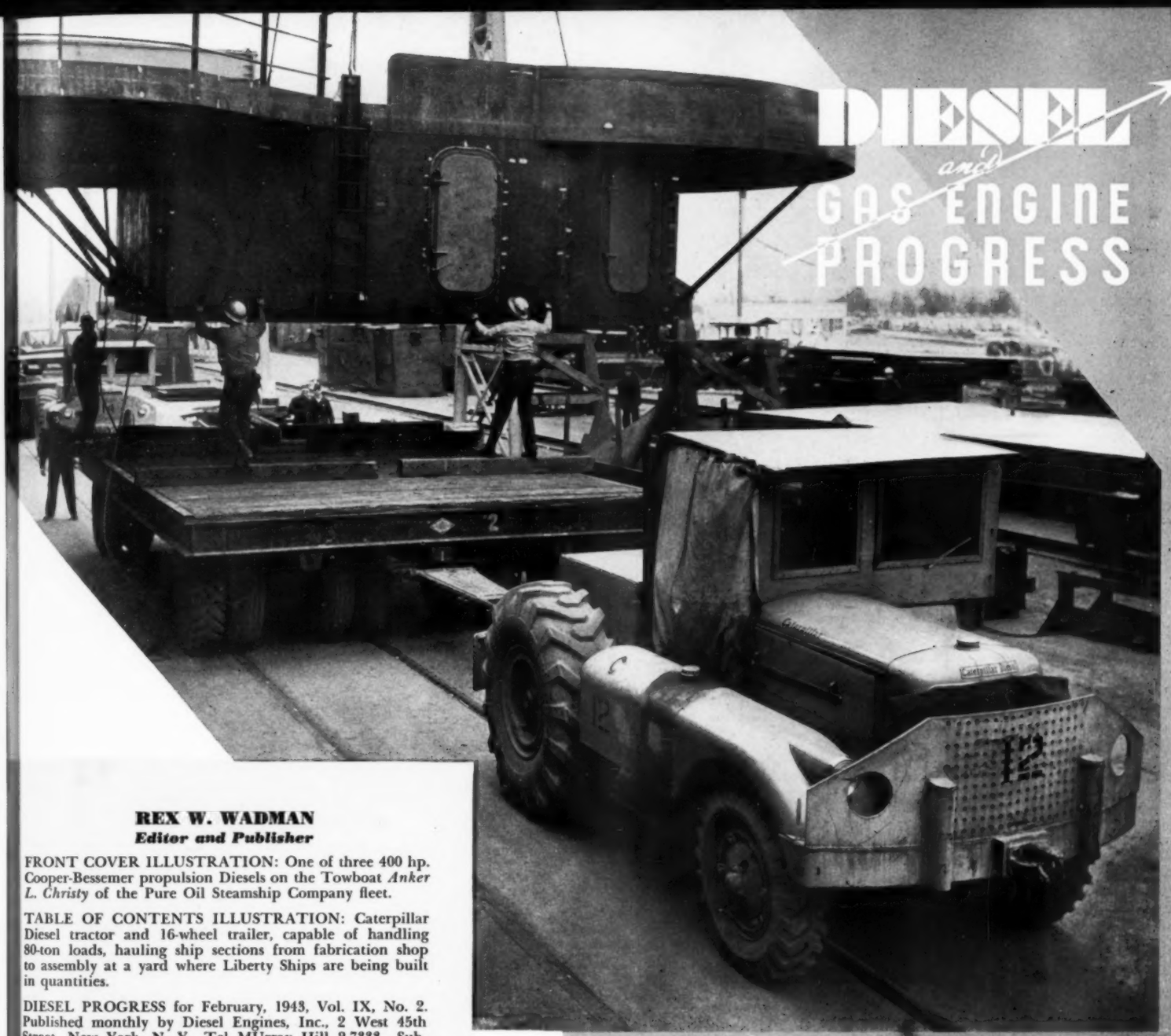
DIESEL PROGRESS



FEBRUARY, 1943

FIVE DOLLARS PER YEAR—FIFTY CENTS PER COPY

DIESEL PROGRESS, for February, 1943. Volume IX, Number 2. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: $5.00 per year, single copy, 50c.



DIESEL and GAS ENGINE PROGRESS

REX W. WADMAN
Editor and Publisher

FRONT COVER ILLUSTRATION: One of three 400 hp. Cooper-Bessemer propulsion Diesels on the Towboat *Anker L. Christy* of the Pure Oil Steamship Company fleet.

TABLE OF CONTENTS ILLUSTRATION: Caterpillar Diesel tractor and 16-wheel trailer, capable of handling 80-ton loads, hauling ship sections from fabrication shop to assembly at a yard where Liberty Ships are being built in quantities.

DIESEL PROGRESS for February, 1943, Vol. IX, No. 2. Published monthly by Diesel Engines, Inc., 2 West 45th Street, New York, N. Y. Tel MUrray Hill 2-7333. Subscription rates, $5.00 per year, 50c per copy.

HEYWORTH CAMPBELL
Art Director

FEBRUARY CONTENTS

Member National Business Papers Association and Controlled Circulation Audit, Inc.

SISTER TUGS CARRY FAMOUS NAMES

By Will H. Fullerton

TWO interesting new Diesel tug boats, the *Admiral Land* and the *Admiral Vickery*, were recently completed in the Kunes Brothers Shipyard, Sausalito, California, for the Richmond Shipbuilding Corporation, Richmond Yard No. 2 of the Henry J. Kaiser interests.

Construction and successful trials were under personal supervision of Walter Fenchel, general marine superintendent of Richmond Yard No. 2 of the Richmond Shipbuilding Corp.

Named for the two top ranking officers of the United States Maritime Commission, these sister tugs are of all-wood construction measuring 88 feet long, overall, and 21 feet wide, over planking, and 11 feet draft. Atlas Imperial Diesel Engine Co. supplied the main propulsion units consisting of its 4 cycle, direct reversible full marine Diesel of 15 in. bore and 19 in. stroke.

Main engine accessories include Kingsbury Thrust bearing, Alnor pyrometer and thermocouples, Weston electric tachometer and direction indicator. The Atlas Engineering Department designed a special three-blade propeller for towing service. These propellers were furnished by the Pitchometer Propeller Company.

The auxiliary equipment also supplied by the Atlas Company is complete in all respects and consists of a Quincy Model D320 2-stage auxiliary air compressor; Blackmer fuel oil transfer pump; Deming bilge pump; and a Deming salvage pump which may, if necessary, be used as an auxiliary fire pump.

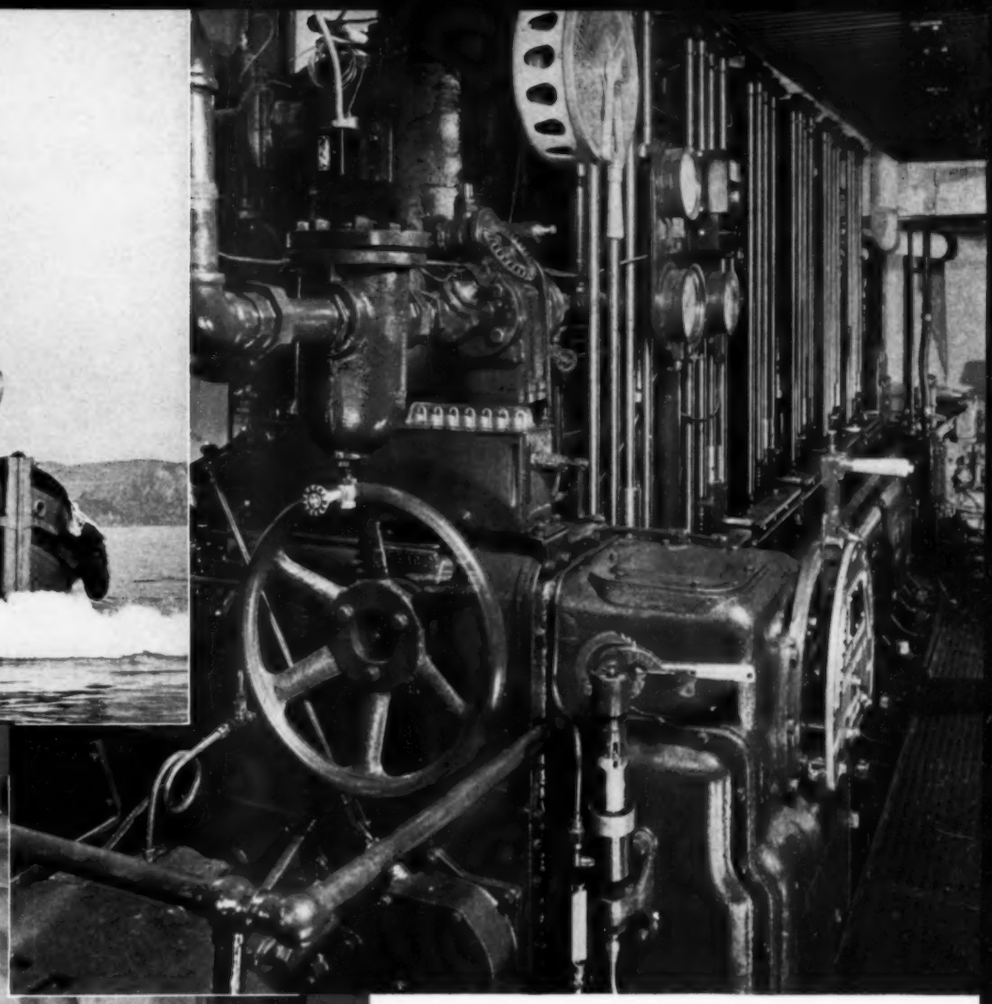
The auxiliary units are all individually driven by direct current, 115 volt electric motors. To supply electric current for these motors, also, the two electric winches, lighting, etc., the vessel is equipped with one 15 kw. Caterpillar Diesel-electric generating unit and one 40 kw. generating unit of the same make. These units were likewise supplied by the Atlas Company.

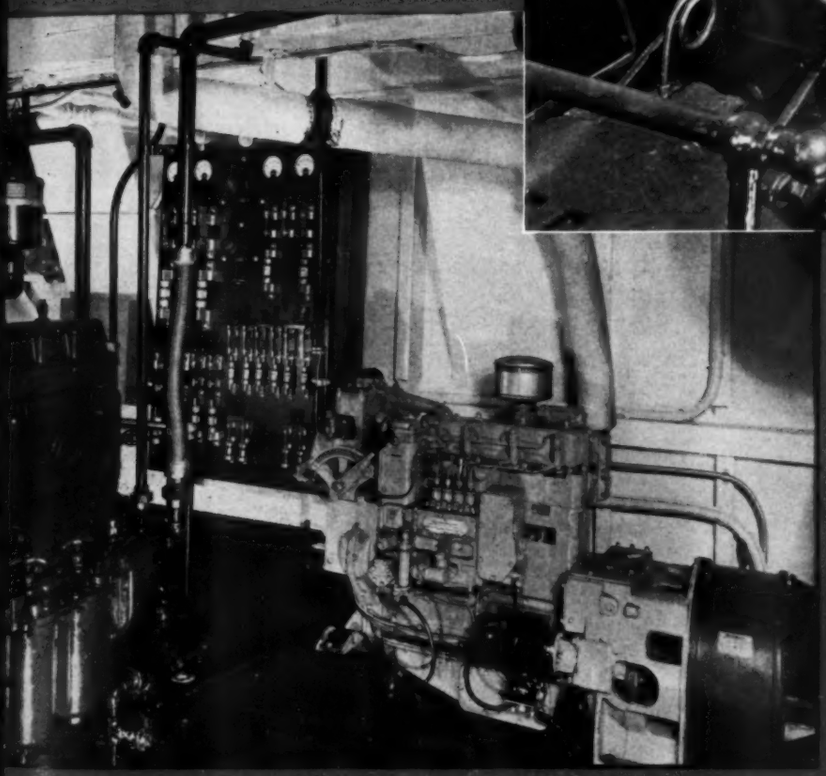
A large electric driven towing winch is installed on the after deck and an anchor winch with warping gypsy heads is installed on the forward deck. No pains were spared by the owner, the boatbuilders, or the Atlas Company in making a first-class job of these vessels in every respect.

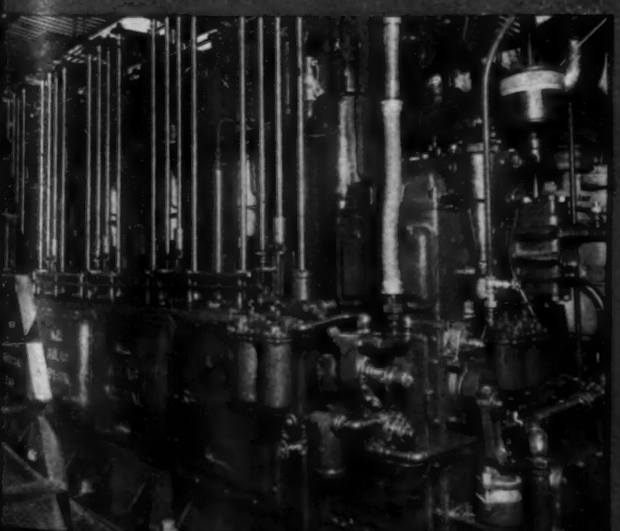
It is contemplated that these tugs will be in u practically twenty-four hours a day by the fou yards of the Richmond Shipbuilding Cor

These yards are, respectively, Richmond Yar Nos. 1, 2, 3, and 3A. The vessels will be utilize when new ships, which are coming out of th various yards at the rate of at least one a da are launched, in moving them from and to th various fitting out docks, and for the countle other services that will be demanded of the in so active a place as a Kaiser shipyard. Be sides being equipped for inside work of thi nature, both the *Admiral Land* and the *Ad miral Vickery* are equipped for seagoing duty

The vessels are of wood construction from lin prepared by the Kaiser Naval architects sta and include throughout the use of Weste woods. As indicative of their strength, it is interest to note that the frames are 5½ i doubled and spaced on 18 in. centers. At eve fifth frame, the specifications called for th vessel to be equipped with a steel reinforci or web frame built up of ⅜ in. plate, in ad tion to which the vessels are stiffened by thr







Across the top: Views of the all wooden, 88 foot sister tugs "Admiral Land" and "Vickery" and an engine room view showing the Atlas Imperial main Diesel installed on both vessels. Note Almor pyrometer, center. Above: One of the two Caterpillar Diesel auxiliary units. Left: Another view of the main Diesel.

watertight steel bulkheads, one directly forward of the crews' quarters in the forecastle, and one each fore and aft of the engine compartment. The 4½ in. planking is all vertical grain Douglas fir. Accommodations are included in the forecastle for eight members of the crew and, directly aft of the pilot house on the upper deck, a stateroom and combination chart house has been arranged for the captain.

These vessels are the largest and most complete Diesel tugs built for use in the San Francisco harbor area in many years, and are a distinct and important addition to the shipping facilities in this splendid harbor. As they will be used for the most part in the handling of ships built by the Maritime Commission for the current war effort, they have been additionally honored by being respectively named after the Maritime Commission's top ranking officers.

The Atlas Imperial Diesel Engine Co., manufacturers of the main engines, are proud to have had such a prominent part in powering these vessels in which they brought to bear their wide experience in the marine Diesel field.

By WM. H. GOTTLIEB

DIESELS SAV

UNTIL 1937, such common conveniences as electric toasters, irons, and other appliances were a rare and expensive luxury in Ogden, Iowa. This community of 1600 population was served by a 25-cycle, 220 volt, power system and citizens could not use the usual economical mass-produced appliances. July 1, 1937, was emancipation day, for on that date Ogden put into operation a new power system with three Cooper-Bessemer Diesel engines as the prime movers. The consumers had another reason for celebrating the day, for Diesel economy permitted a two cent reduction in the charge per kilowatt hour.

Ogden first gave its citizens electric lights half a century ago and has owned the distribution system ever since. The original power producer was a steam engine and, when this was abandoned, power was purchased at wholesale rates from a private utility. Even as late as 1936, the wholesale price per kwh. was high, starting at 3.85 cents and descending to a bottom price of three cents. Under these circumstances, the lowest rate Ogden could charge its citizens was 9 cents per kwh. for the first 20 and down by easy stages to a bottom price of 6 cents per kwh. for all over 100. The municipal plant cut the power cost to the city more than 50 percent and permitted a rate reduction of 2 cents per kwh. in every bracket but the lowest where the cut is 2.5 cents. In the first four years of plant operation, the consumers have saved more than $60,000, a goodly sum.

Nearly every small municipal power plant starts with the handicap of a small production volume which makes the initial cost per kwh. of such fixed costs as labor, interest, and insurance higher than normal. Ogden started at even a greater disadvantage because use of appliances was so far below normal. But citizens were quick to take advantage of new rates and new opportunities to utilize the convenience of electricity. Sales of toasters, irons, refrigerators, and other equipment boomed, and plant production started strongly up the ladder. Production for 1938, the first complete year, was just 649,845 kwh., but every succeeding year showed an advance of more than 50,000 kwh., with a total of 3,036,905 kwh. in four years.

If the city had purchased 3,036,906 kwh. at prevailing rates, the cost would have topped $100,000. The total cost of Diesel operation for the four years was $45,000, a saving to the city of $55,000. The investment in the new power system was $91,000, of which $31,000 was for the distribution system. Of this total sum, the city already has paid out of plant earnings $40,000 and had another $10,000 in cash by June, 1942.

Earnings will pay off the entire indebtedness by 1944, just seven years after the plant went into service. The net profit on plant operation is increasing steadily, for consumption of electricity is going up and the cost per kwh. is going down. In the first three months of 1942, the cost per kwh. of fuel, lube, labor, maintenance and supplies was 11.41 mills.

The plant was designed to give efficient service from the first and yet accommodate an expanding load. The engines installed were three four-cycle, mechanical-injection, Cooper-Bessemer Diesels, one of six cylinders, 10½ in. bore and 13½ in. stroke, rated at 250 hp. at 400 rpm. and two 4-cylinder units of the same bore and stroke, rated at 185 hp. at 400 rpm. Virtually all parts for the three engines are interchangeable. The big unit drives directly a 238 kva., 167 kw., 3-phase, 60-cycle, 2300 volt, Electric Machinery generator with 10 kw. V-belted exciter. Each of the smaller engines is direct-connected to 178 kva., 125 kw. Electric Machinery generator with 7½ kw. V-belted exciters. Peak load for the plant has been 220 kw. which can be handled readily by any two engines, leaving the third in reserve. Yet, one of the smaller engines can carry the small night load with comparative efficiency. Usually one small Diesel can handle the load for all but five or six hours a day when either the big unit is run alone, two small units together, sometimes one big and one small engine. Careful operating of this flexible plant has resulted in a good operating engine load factor.

Ogden soon will have a debt-free power plant and it will be actually more efficient as a power producer than it was the day it went on the line. This can be attributed partly to improving load conditions, partly to design of engines and accessories. The engines show virtually no wear after five years' service.

Sinclair Rubilene medium heavy lubricating oil is circulated throughout each engine under pressure by a pump driven off the crankshaft. Included in each engine circuit is an edge-type filter and a turbocharger oil cooler. Once a week, the lube is drained and put through a Renuoil activated clay purifier. The 36 gravity fuel oil is purchased in tank-car lots and unloaded by a motor-driven rotary impellor-type Viking pump into two storage tanks with a combined capacity of 17,000 gallons resting on concrete cradles outside the plant. The pump is used to transfer fuel from storage through individual Neptune meters and Sentinal filters to 100 gallon elevated day tanks inside the engine room. The fuel then feeds by gravity to the engine pressure pumps which supply the Cooper-Bessemer pressure-relief injection system. Fuel injection is regulated to meet load conditions by Woodward relay-type governors.

Engine jacket water is cooled in the coils of a Marley induced-draft cooling tower which has capacity to serve 675 hp. Four additional coils can be installed in the tower, raising its capacity to 975 hp., thus allowing for considerable plant expansion. Four Ingersoll-Rand motor-driven centrifugal pumps, each rated at 160 gpm. vs a 75 ft. head, circulate cooling water, one of the closed engine jacket system, one on the tower cooling supply, and two as standbys. All make-up water, whether for the inside or outside circuits, is treated in a Permutit softener. Air for each Diesel is drawn through an individual two-unit American air filter set outside high on the plant wall.

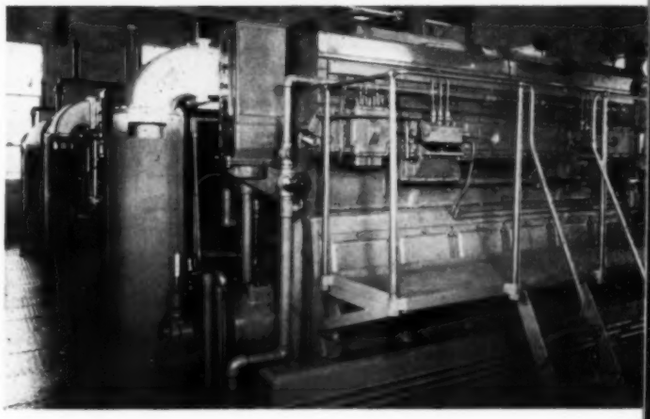
The plant is located just across from the city park and just a block from the main business section and so it was desirable to reduce noise to a minimum. This was accomplished successfully by sending exhaust gases through three Maxim silencers. The silencers are in a brick housing at the rear of the plant and motor-

driven fans pull in hot air to heat the building in cold weather.

This is a convenient plant from the operator's standpoint. There is a gauge board on each engine with U. S. pressure gauges on lube, fuel, and starting air, and a Reliance tachometer. Mercoid switches set off an alarm if lube pressure drops below 10 lbs. or jacket water temperature goes above 145 deg. The 6-panel General Electric switchboard is well-equipped and there is a Simplex vibrating-contact voltage regulator serving the entire plant. Any point in the plant can be reached with the 1½-ton Hercules hoist. Starting air is provided by a Gardner-Denver compressor which can be V-belted to either electric motor or gas engine.

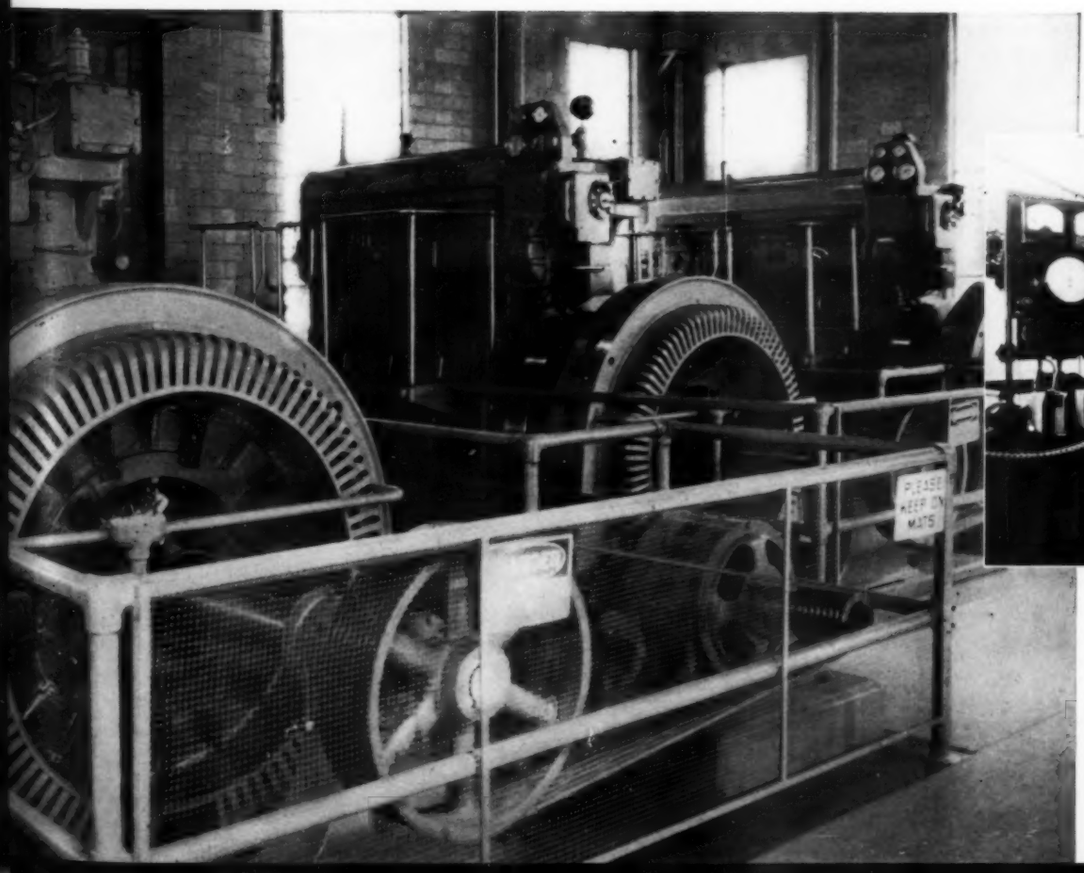
The plant is run by three operators and one relief man, working eight-hour shifts six days a week, under the active supervision of Superintendent W. J. Manion. Much credit for the progressive policies of the department belongs to Mayor C. T. Williams and Councilmen C. E. Cook, chairman of the light department, C. W. Shaffer, Otto Ehlers, W. M. Walker and Alvin Trealor. After years under a handicap, this community which pioneered in electric service is ready to make the most of modern equipment. A dependable, economical Diesel plant has opened the way.

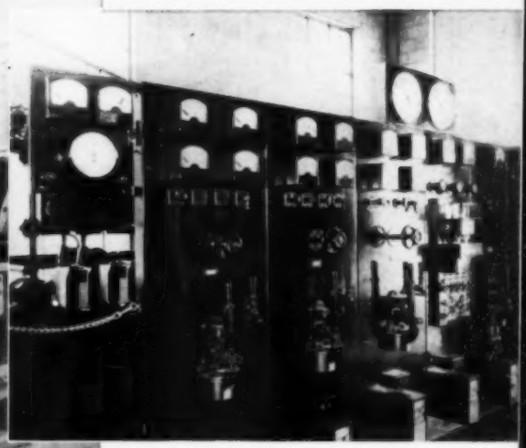
Ogden's modern brick and stone power plant building adjoins the city park.



Operating side of one of the three Cooper-Bessemer Diesels showing Woodward governor, fuel injection pumps, and, upper right, pressure gauges and alarm.

CONSUMERS $60,000 A YEAR





Above: The switchboard is G. E. made and equipped except for a Simplex voltage regulator. Left: View shows one 250 hp., foreground, and two 185 hp. Cooper-Bessemer Diesels and EM generators.

Coast Guard's Bid to Keep Winter Traffic Open Between the Great Lakes and the Gulf

By DOUGLAS SHEARING

THE United States Coast Guard has "beat the gun" on what has been so far the earliest and severest winter on record in the Midwest in over forty years. Heretofore, winter ice conditions have restricted river borne traffic on the waterway between St. Louis and the Great Lakes. With characteristic foresight, the Coast Guard contracted last spring with Peterson-Haecker, Ltd., shipyard at Blair, Nebraska, for an ice breaker to provide the first effective means of freeing ice-locked riverways north of St. Louis. This new ice breaker, called the *Fern,* is the first of her kind introduced in this country and uses an 85 ton plow such as was heretofore popular for like service in Holland with water ballast to control its weight.

Fern, having dimensions of 114 ft. x 30 ft. with a draft of 5 ft. 6 in., was designed by A. M. Deering, Naval Architect of Chicago, under the direction of the Coast Guard. Mr. Deering and the builders, Messrs. Peterson and Haecker, were aboard the *Fern* at the time of her launching. She is of triple screw design, her main engines being of Fairbanks-Morse make, each developing 320 hp., direct drive, at 400 rpm. Each main engine is 8-cylinder 10 in. x 12½ in. bore and stroke. The engines are directly reversible. Main engines are located midships and are arranged for remote pilot house operation with Westinghouse finger tip pneumatic controls. Auxiliary power is provided with twin F-M 20 kw. Diesel driven AC generating units mounted on Korfund vibration control equipment. Auxiliary generators are arranged for operation singly or in parallel. Both main and Diesel auxiliary engines have a common closed cooling system using fresh water.

The general accommodation layout is of characteristic Coast Guard arrangement wherein all enlisted personnel is located aft and the Chief Officer's and Chief Petty Officer's quarters are forward in the partly sunken main house and texas. Pilot house is of the retractable type, hydraulically operated.

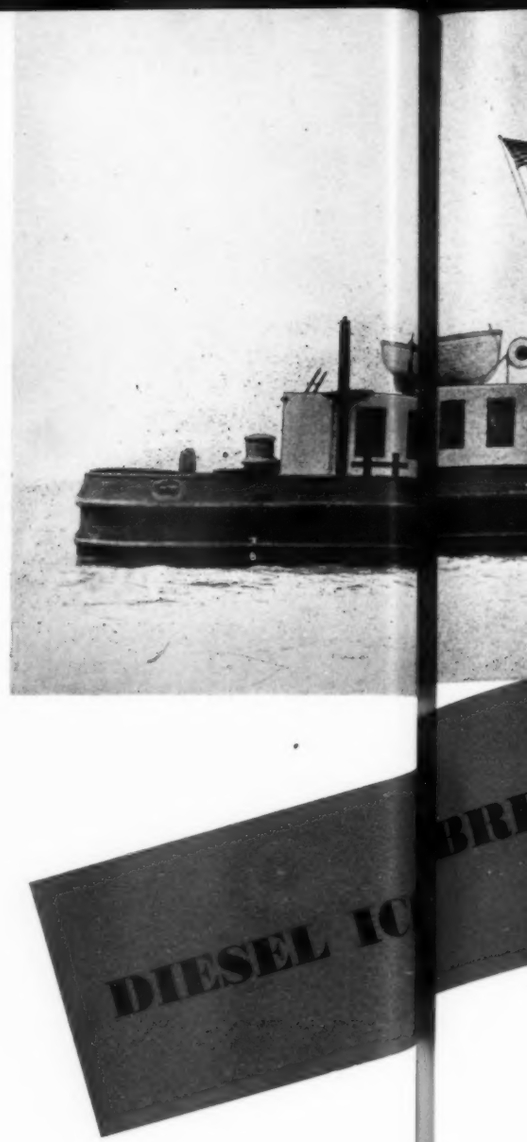
Assisted by two commercial towboats recently chartered by the Coast Guard, *Fern* is to keep the channel open on the Illinois Waterway and on the Mississippi River from Grafton to Dam No. 26, Alton, Mile 202 above Cairo according to Captain Yeandle in charge of the Ninth Naval Coast Guard District which includes the Mississippi and its Tributaries.

Fern has already demonstrated her worth as an ice breaker, having plowed through 12 inch to 14 inch ice with comparative ease on her first ice breaking assignment December 10. It will be noted from the accompanying pictures that the 85 ton Amsterdam plow is a separate all-welded heavily designed structure. *Fern's* hull is of the semi-moulded V-bottom design, transversely framed, and of all-welded rugged construction to meet the strenuous work of ice breaking. The two structures, main hull and plow, are so designed that they join snugly and may be securely lashed as one unit when in service.

On her first assignment, she was sent from St. Louis up into the ice-locked waterways as far north as Seneca, Illinois. On the way, she freed a number of tugs and towboats and saved several barges from sinking. While on her trip, a towboat was observed pushing barges at Starved Rock Lock and Dam, Mile 231. As this tow was entering the lock, her condition became dangerous due to heavy ice formation and the skipper of the tow called the *Fern* by megaphone. The *Fern* drew alongside rendering prompt motor pump assistance and subsequently towed the disabled barge to a mooring pier.

Fern also gave valuable assistance to two Lake barges ice-bound at Hennepin, Illinois. To further prove her worth on this initial assignment, she was able to free three additional tugboats, one of which handled four coal barges. Lt. Commander Edward A. Stanton, Chief Coast Guard Inspector in charge of constructing *Fern* accompanied the cutter on this first trip and had a splendid opportunity to witness her qualities for the service intended.

Steering is by means of electric hydraulic gear for go-ahead and flanking rudders, the steering gear having been manufactured by Peterson-Haecker.



Both steering and engine maneuvering is handled from a common control stand in the pilot house with Westinghouse Air Brake Company's pneumatic controls.

General heating is of the hot water type using the moniflow principle. Crane Company's heating system and valves are used throughout. The galley and mess room is located aft of the engine room and is equipped with electric refrigeration. General service water is taken from the bunkers while the sanitary water is taken from the river. Both systems are fully automatic and are of the F-M package pressure type. Other equipment on the *Fern* includes two electric capstans built by the Modern Engineering Company, a Carlisle and Finch searchlight, Shipmate range, Simmons beds and Allis-Chalmers voltage regulators. The shafts and pillow blocks are of Medart Company's make. Switchboard for the control of Diesel auxiliary generating units and all motor driven auxiliaries are made by the Omaha Electric Works and is equipped with Westinghouse meters and circuit breakers. Engine room auxiliaries, which

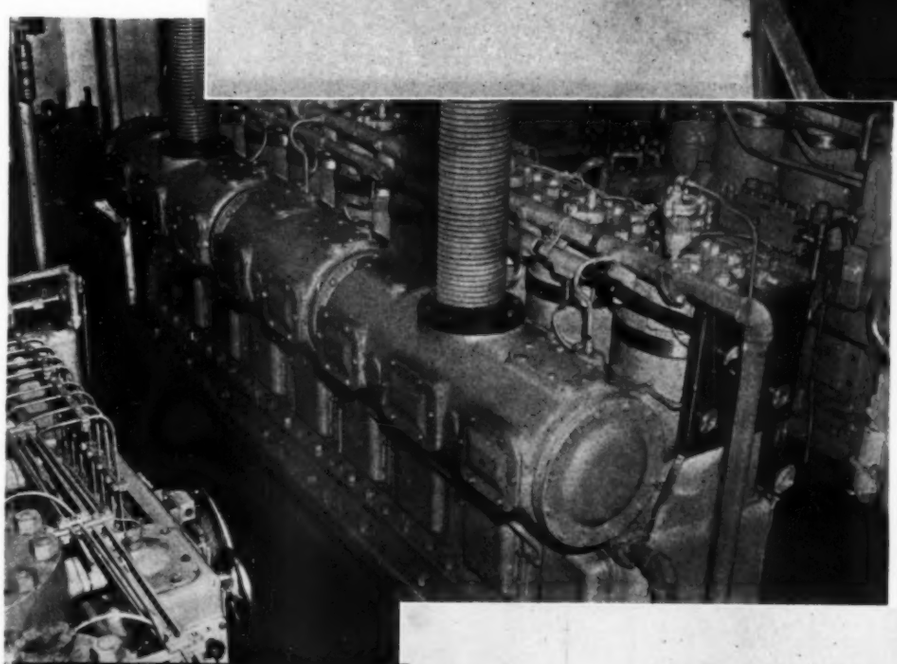
Left: The 114 ft. Coast Guard Ice Breaker "Fern" appears as a conventional river tow boat without its plow. Below: Left to right, A. M. Deering, Naval Architect, Messrs. Peterson and Haecker, builders, aboard the "Fern" at the time of launching.

BREAKER "FERN"

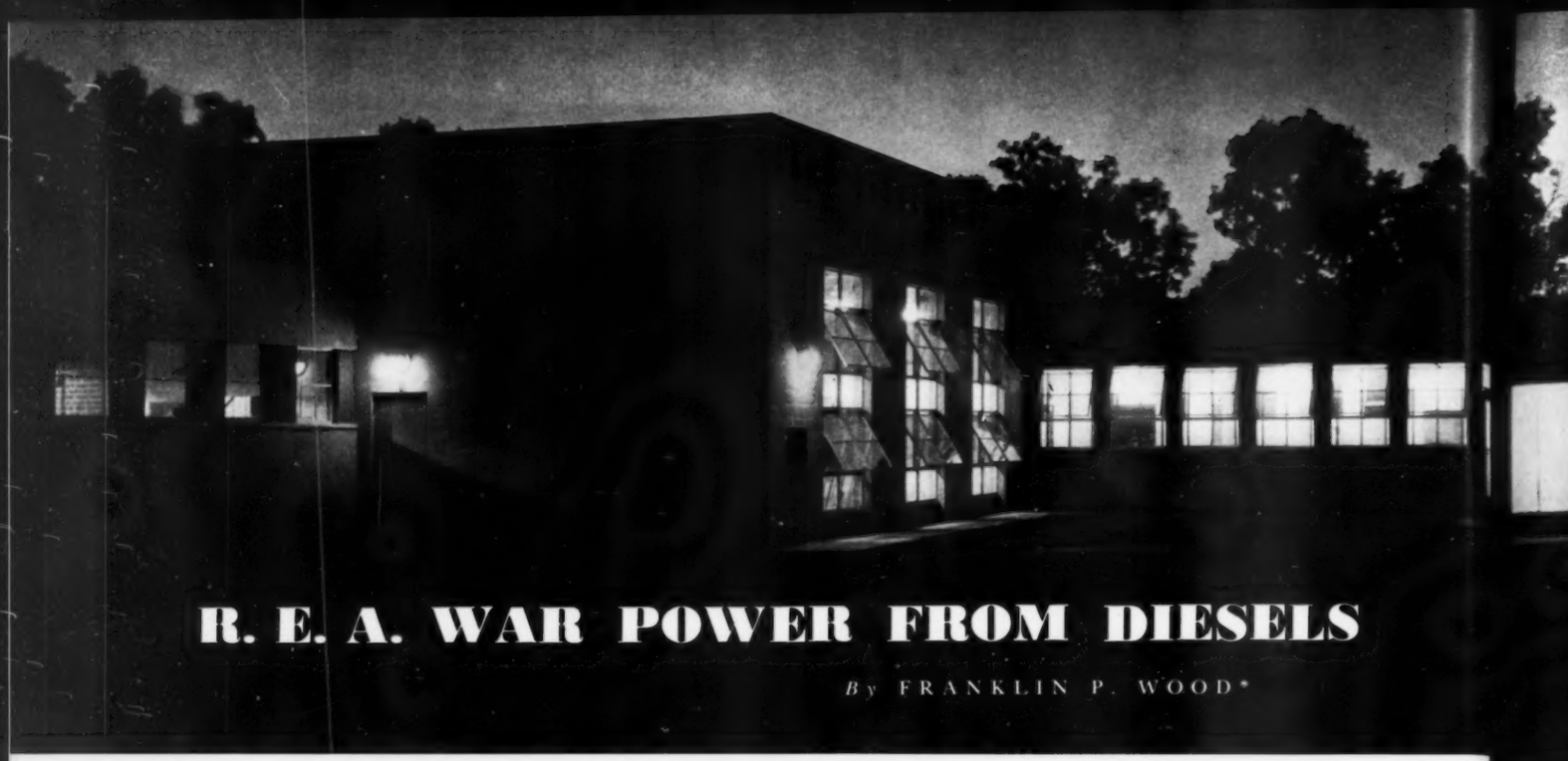
are driven by F-M AC motors, include a Gardner-Denver compressor and a Waterous bilge pump. Burgess exhaust snubbers are used for main and auxiliary engines. Pyrometers are of Alnor make, and Briggs purifiers insure clean fuel and lubricant systems.

Because of Wartime urgency for maximum waterway transportation this winter, the Coast Guard will use the *Fern* throughout the winter months to facilitate a clear channel on the rivers right through to the Great Lakes. She will be under the command of the St. Louis District of the Coast Guard with her home port at Peoria, Illinois.

Although the Coast Guard Cutter *Fern* will not be in the Solomon Islands or on the African Coast, she will nevertheless be engaged in one of this Nation's most important battles throughout this winter and it is a tribute to the foresight of our Coast Guard and its commanding officers that such an effective means has been provided of keeping these important river services open.



Above: The "Fern's" three main engines show in this view -8 cylinder, 320 hp. Fairbanks-Morse Diesels. Right: Bow view showing the 85 ton plow attached.



R. E. A. WAR POWER FROM DIESELS

By FRANKLIN P. WOOD*

A night view of the Florida Cooperative's office building and Diesel generating plant.

MOBILE Diesel generators developed by Rural Electrification Administration engineers are shuttled back and forth from state to state, fire-engine fashion, to meet the changing emergency power needs of wartime expansion. A few months before our entry into the war, all except four of the mobile units belonging to R.E.A.-financed rural electric systems were supplying normal farm power needs. Today, only a third of the units supplies such needs. The others are kept busy on war emergency services.

R.E.A. systems own twenty mobile units built by the Ready Power Company. Each of these is powered by two International Harvester 90 hp. Diesel engines operating two 50 kw. capacity generators. Five units now being operated were built by General Motors, with GMC engines. The engines, generators and a 100 kw. substation transformer are all mounted on a trailer base and can be hauled by a truck or tractor unit over the highways at forty miles an hour. Each mobile unit carries enough fuel and water for full capacity operation for approximately twenty hours and will deliver power at any desired voltage from 220 v. to 7200 v.

During the past year, these travelling power plants have, among other jobs, supplied electricity for a Texas ordnance plant; a defense trailer camp in Idaho; war loads in Alaska; an airbase on the south Atlantic coast; a North Carolina marine base; construction of a Virginia Army cantonment; a Naval ammunition depot in Indiana; and two Tennessee dams. In no case did one of these jobs experience "too little, too late" in power service.

In May 1941, the R.E.A. Cooperative, serving the North Carolina coastal area, faced the immediate necessity of increasing its power capacity to serve developing Navy and Marine loads and defense housing. Two mobile units were rolled in from the factory between June 7 and 14. They went into service immediately and the system arranged to lease two more units owned by a Kansas cooperative. By the middle of July, these had arrived and were working 24 hours a day.

On September 14, William Morris, a field engineer who helped to coordinate R.E.A.'s power program in that area, reported to our Generation and Transmission Section that the four mobile generators had been "life savers." They could not keep pace with military plans, however, and, on October 13, two more mobiles were brought in from Virginia where they had formerly served as a source of farm power for an R.E.A. cooperative.

Throughout the piercing coastal winter, these six Diesel generators continued to meet the increased demands of post-Pearl Harbor military preparations. By late February, however, permanent generators were ready to operate.

On February 24 one of the mobile units was coupled to a truck and moved to Center Hill Dam in Tennessee where it operated until it was moved again to Dale Hollow Dam. Another rolled away June 16 across South Carolina, Alabama, Mississippi, Louisiana, and into Texas to serve the Pantex Ordnance Plant. A third was released on July 21 to furnish power for an island airbase along the Atlantic coast, and on September 9 the last of the mobile units not owned by the North Carolina Cooperative was requested by the Navy for service in a similar location.

The contribution of R.E.A.'s mobile Diesel generators is well summed up by a letter from F. E. Woodruff, assistant project manager for Freese & Nichols, construction contractors on the Pantex Ordnance Plant, which said in part:

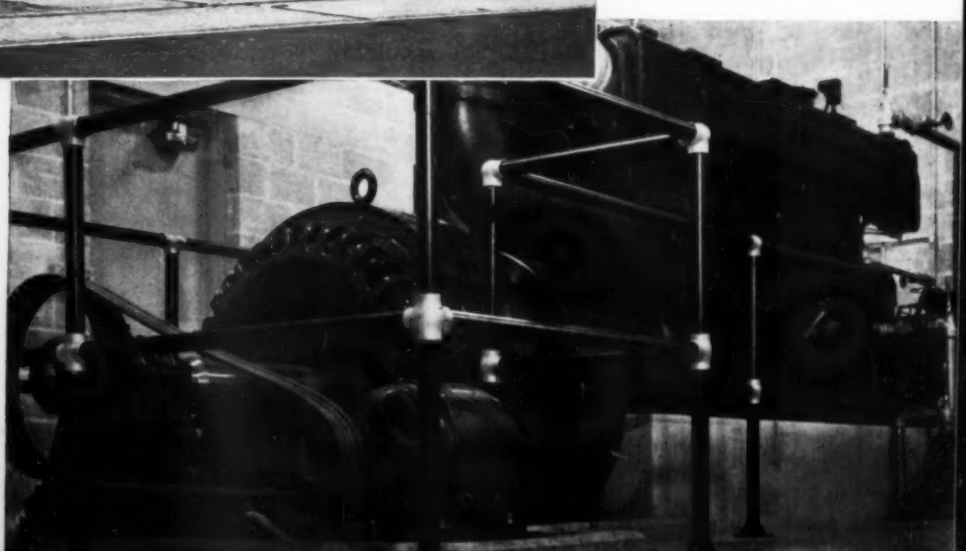
"The R.E.A. mobile unit is . . . doing yeoman service in carrying the floodlighting for the night-unloading shift and also the 24-hour job of the saw-load in the lumber-cutting shop. It is doubtful whether our project could have been kept on schedule were it not for this unit."

The wide variety of wartime uses, which have developed for mobile Diesel generating plants, is reproduced on a larger scale by R.E.A.'s per-

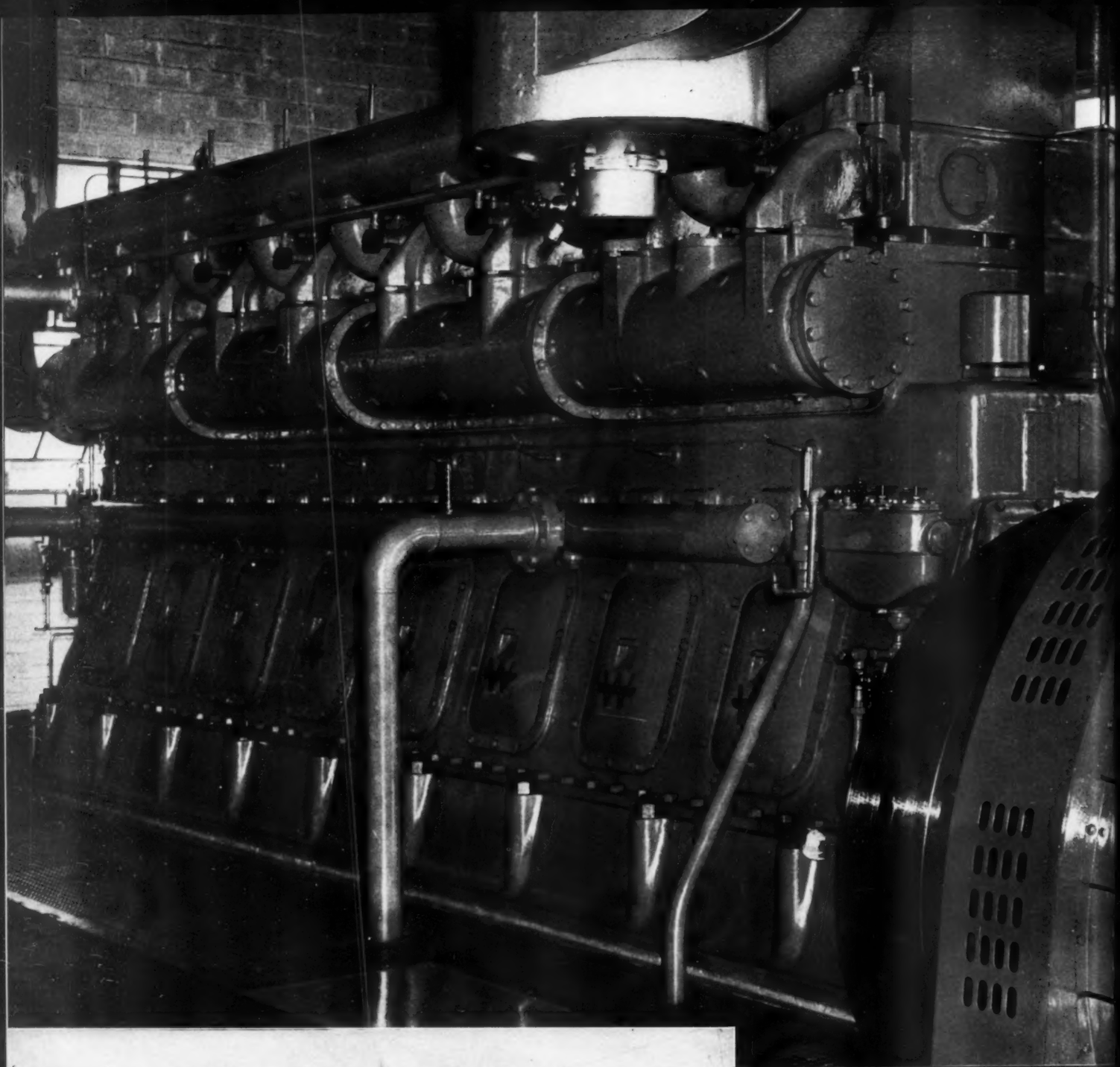
* *Head, Generating and Transmission Section, Rural Electrification Administration.*

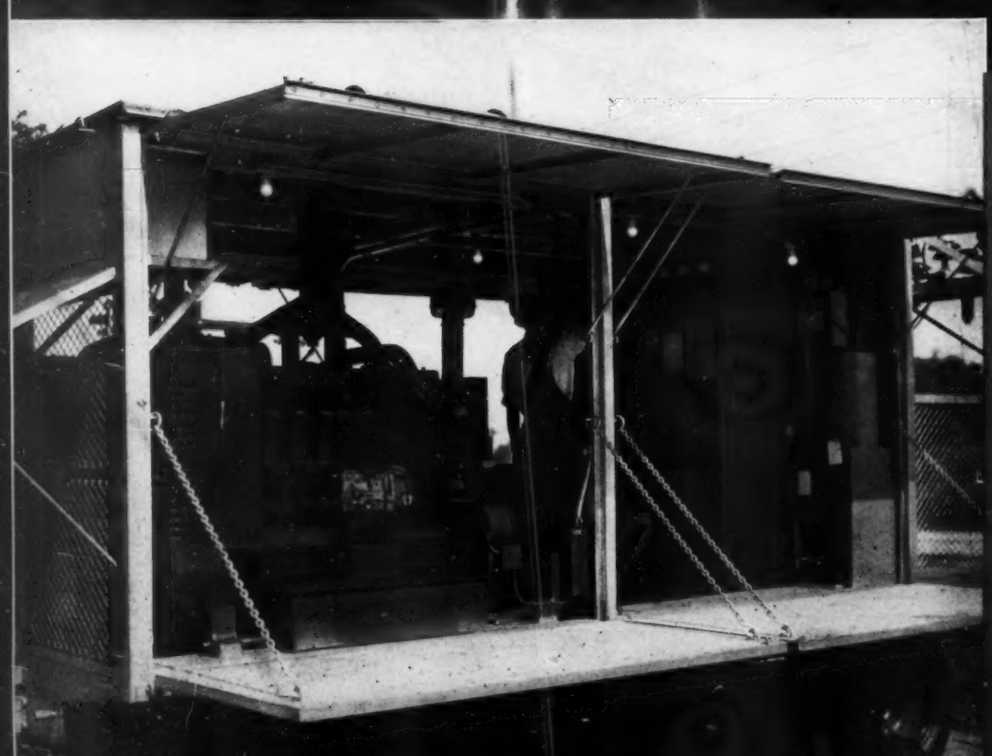
Partial view of a 2500 hp. Diesel generating plant of an R.E.A. Cooperative in Michigan. ↑

R.E.A. mobile Diesel generator and sub station ready to roll over the highways to an emergency war job.



One of four Diesel units in the Florida Cooperative serving almost a tenth of the electrified farms in Florida.





← *R.E.A. mobile Diesel generating plant on location near Suffolk, Virginia.*

manent generating facilities which have doubled their kilowatt hour output during the past year. R.E.A. borrowers now have 28 permanent Diesel generating plants operating in fourteen states and the Virgin Islands. In addition, 15 per cent of all power purchased by R.E.A. systems is obtained from municipal systems most of which use Diesels in their generating stations. It is estimated that Diesel engines of one kind or another are responsible

View of the Diesel generating unit in the Shenandoah Valley, Va., Cooperative.

for more than 20 per cent of all power distributed by R.E.A. systems and 30 per cent of all such power not furnished by Government hydroelectric projects.

In Virginia, electricity produced by R.E.A. Diesel engines serves an Army camp and airway beacons; in North Carolina, an airbase, Marine base, and defense housing; in Washington, a Navy training station, Coast Guard station and airway beacon; in Utah, a lumber mill; in Maryland, a Navy pumping station, State Guard camp, observation post and Naval air station; in Minnesota, lend-lease milk production; in Michigan, a carburetor factory; and in Florida, Army engineers, an Army post, airbase construction, and an Army airbase. Throughout the country, these Diesel generating stations also provide reliable electrical service for increased food production through use of electric labor-saving equipment to replace drafted farm laborers.

A large carburetor manufacturing company in Michigan is an important war industry operated from electricity generated by the three Diesel plants of an R.E.A.-finance cooperative. This electrically operated factory was moved to its rural location only after careful investigation of the source of power for present and future needs. Diesel-produced electricity in this carburetor factory operates lathes, grinders, hacksaws, sanding machines, electric furnaces, and cadmium plating devices in addition to 25 punch presses. The superintendent of the factory comments: "Our company has never had reason to regret moving to the country. Adequate electric energy is necessary in any modern industrial program, large or small. R.E.A. has given us this power and they will be serving us with much more of it unless all signs fail. Rural industry is on the upgrade."

The Diesel-driven generating plant of a cooperative which furnished electricity for almost a tenth of the electrified farms in Florida is another example of how Diesel engines are contributing to war production. The plant consists of two 150 kw. capacity Diesel units and two 473 kw. units.

The Federal Power Commission recently ordered this system to be interconnected with facilities of a large private power company to help make the state's generating capacity available wherever power might be needed most. The cooperative's lines serve a tung oil plant, phosphate mine, oil producers, airbase construction, the Army engineers, and an Army controlled airbase.

The wartime service of these Diesel generating plants is typical of the 793 R.E.A. systems operating in 46 states, Alaska, and the Virgin Islands. These rural electrification systems now serve more than 15,000 large users, of which 1600 are food processing plants and 900 are other industries also contributing to the war effort. Among war loads served are a large aluminum plant in Arkansas, 300 oil wells, mercury, lead, zinc and manganese mines. In addition, R.E.A. borrowers supply electricity for fifty U. S. Army and Navy bases, 220 airway beacons, forty airports, and other direct military loads. In view of this increased activity during war times, the Rural Electrification Administration staff faces growing responsibilities in supervising the operations of R.E.A.-financed rural electric systems. More than 95 per cent of these are cooperatives or public bodies with no previous experience in generating and distributing electric power. The combined experience and judgment of R.E.A.'s personnel must fill the gap.

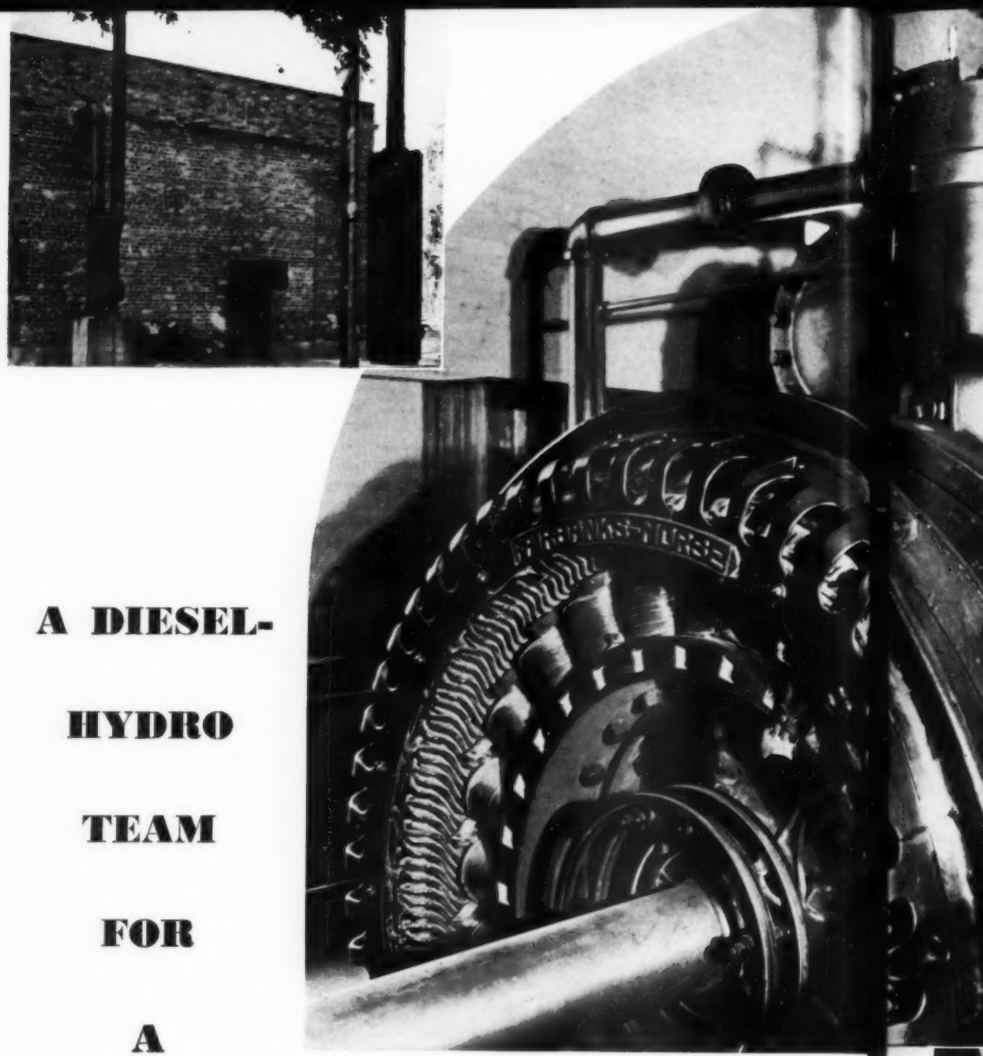
It is the job of the R.E.A. staff now to see that every farm and war establishment on the lines of these systems gets continuous, efficient electric service in order that they may make their maximum contribution toward winning the war. Although handicapped by loss of trained employees, the R.E.A. staff furnishes its borrowers with legal, engineering, management, and other technical services and assists them in bringing electricity to war loads in their communities. It is necessary in many cases for one staff member to do two jobs during the emergency, but R.E.A. is making every effort to carry out its legal mandate to protect the government's investment and assure dependable wartime service.

Thus far, R.E.A. systems are making a good start toward repaying their Federal loans ahead of schedule. They have made advance repayments of $6,672,139 and total payments of $28,849,747 on the $358,224,354 advanced up to August 1 against loan allotments totalling $459,543,145.

Assuring sound operation of rural electric systems and adaptability to war loads, however, are only the primary steps in fitting the farm electrification program into a war economy. In wartime, rural electricity must do the work formerly done by men now in the armed forces or war industries. Many farm people do not understand such uses, since electricity is a new tool brought within reach of most farmers only in recent years. R.E.A. is, therefore, faced with the job of helping rural people throughout the nation to use electricity for maximum and efficient food production.

Throughout the war, the R.E.A. staff will continue to do double duty in order to aid rural users in making the best possible use of this tool which has been brought to them—in a large measure—by the development and wider application of Diesel engines.

By GEORGE D. CROSSLEY



A DIESEL-HYDRO TEAM FOR A TAX-FREE TOWN . . .

A HYDRO-DIESEL team is providing low cost power for Union City, Michigan, the year around, supporting the lowest rates in the town's history and returning a sufficient profit to pay all the costs of local government. This community of 1600 population is a veteran in the provision of electric power to its citizens, starting half a century ago with a 50 kw. steam plant. This was supplanted in 1923 with a hydro plant which now has a capacity of 535 kw. This plant taught Union City the meaning of power economy but hydro alone was incapable of supplying the demand throughout the year. Seeking the most economical means of carrying the load through the fall and winter months, the town decided upon Diesels and purchased in 1930 a 225 hp. Diesel engine which had seen long service at another installation. The growing demand rose as high as 290 kw. and expansion of the Diesel plant was necessary so that Diesels alone could carry the peaks. Convinced that a new, modern Diesel was the answer to their power problem, Union City officials put into operation on October 1, 1941, a 6-cylinder, 14 in. x 17 in., mechanical-injection, two-cycle, Fairbanks-Morse Diesel rated at 450 hp. at 300 rpm. The engine drives directly a 300 kw., 80% pf., 3-phase, 60-cycle, 2300 volt, F-M alternator with V-belted exciter.

Initial experience with the new prime mover confirmed the judgment and fulfilled the expectations of the town's directors of power policy. Operating satisfactorily with a cheap fuel, the Diesel produces 13.5 kwh. per gallon with a load of 200 to 220 kw. During the first four months of operation, the break-in period, the engine produced 12 kwh. per gallon with an average load of only 158 kw. or approximately 50 percent of engine capacity. During this period, the engine was run 868 hours and consumed just 110 gal. of lubricating oil which means more than 3500 rated hp. hrs. per gallon of lube. With fuel at 4.75 cents a gallon and lube at 29 cents a gallon, the total fuel-lube cost was 4.2 mills per kwh. With the better, steady load of normal operations, experience shows that the fuel-lube cost will drop to 3.75 mills per kilowatt hour.

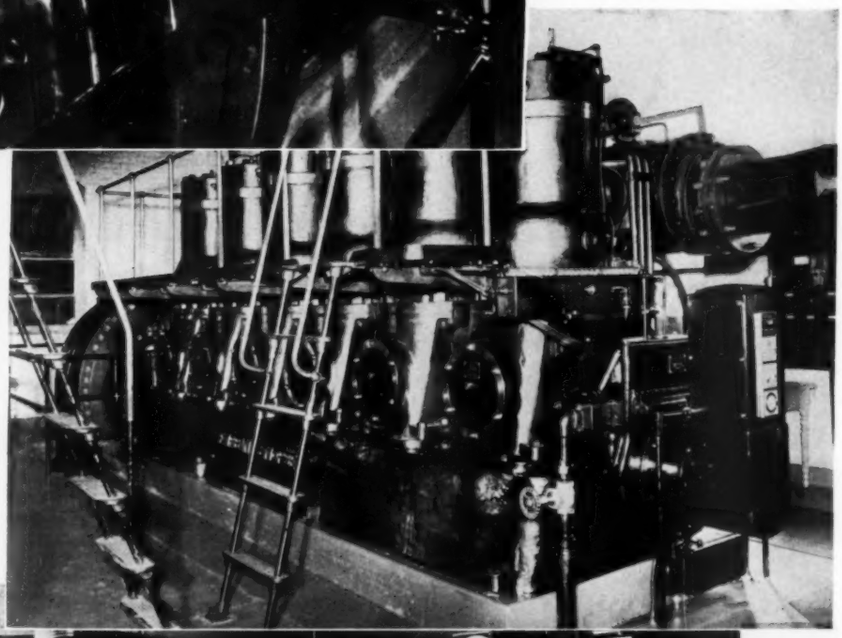
The labor cost has been held to a minimum by housing the Diesels in the city water works where a man is normally on duty. The hydro plant also is controlled from this point so that actually the installation of Diesels has not increased the municipal payroll. All maintenance work is done by the regular operators. In the first year there were no repairs on the new Diesel. The operating schedule is regulated to fit the supply of water at the hydro plant. It is expected that the Diesels will carry virtually all the load during September, October, November, December, and January, and will operate intermittently during July, August, February, and March.

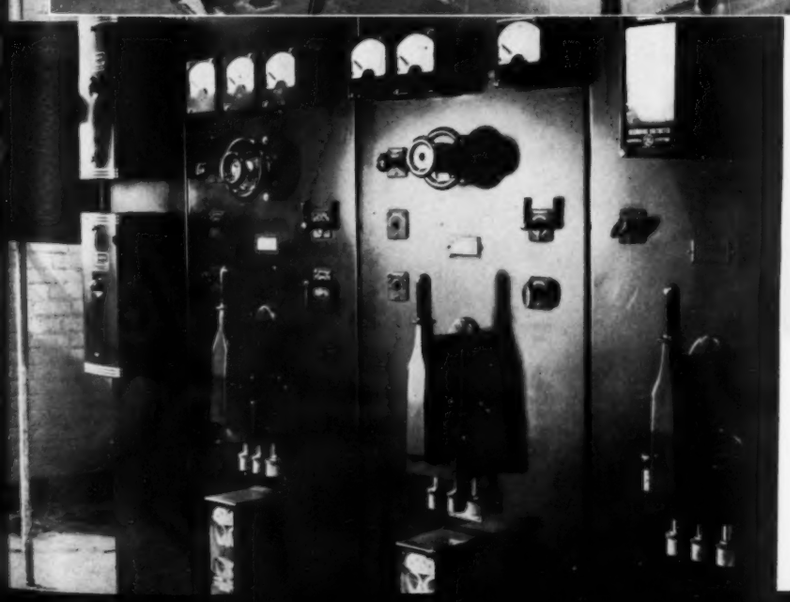
The plant is designed for operation with a minimum of attention. The No. 4 Diesel fuel is unloaded from trucks by gravity into two underground storage tanks with a combined capacity of 6,000 gallons. The supply pump built into the F-M Diesel draws fuel directly from the storage tanks to the small supply reservoir on the engine which also houses the injection pumps. The quantity of fuel delivered to each cylinder by its individual injection pump is regulated to meet load conditions by a relay-type governor. Fuel is metered between storage and the engine.

Lubricating oil is fed automatically to the crankcase for bearing lubrication from a small supply tank near the engine. The lube returns to the tank through a filter forming a continuous circuit which requires no attention. Cylinders are supplied with lube by force feed mechanical lubricators. Every six weeks the crankcase and supply tank are drained and a fresh charge of oil is put into the system. The used oil is being stored and will be reclaimed for further use in the engine.

The cooling water system is highly flexible with eight radiator units set in the walls of the

Extreme left: Exterior view showing Maxim Silencers and American air filters. Above: Exterior view of the Union City, Michigan, power plant. The two engines shown here are Fairbanks-Morse Diesels, 450 hp. and 225 hp. respectively. Bottom view: The modern and completely equipped G.E. switchboard





engine room and the adjoining work room. Water is pumped through the radiators and the engine jackets by a 3 in. centrifugal pump direct-connected to a 5 hp. motor. Louvres are arranged so that the amount of air sent across the water coils of each radiator can be regulated and air can be drawn from either inside or outside the building. In cold weather, heated air is discharged inside providing all necessary heat for the building. All louvres can be controlled from the engine room. Only city water, put through a softener, is used as makeup for the engine cooling supply.

The new engine is a crankcase-scavenging Diesel. All engine air is cleaned by a four-unit American air filter set about six feet off the ground just outside the plant. From the filters the air goes to a header under the engine room floor and then up to the crankcase. Exhaust gases go from the engine header directly out to a Maxim silencer outside the building. The Diesel is started by compressed air provided by a compressor which can be belted to either an electric motor or a small gasoline engine. An alarm system summons the operator if water pressure or water temperature goes outside predetermined limits. Also on the alarm panel are a multi-point exhaust pyrometer and controls for motor-driven accessories. The four-panel switchboard holds two voltage regulators, a synchronizer, totalizing kilowatt-hour meters, and a recording voltmeter in addition to ammeters, kilowatt meters, a cycle meter, etc.

The small user of electricity pays a comparatively high rate of 9 cents a kilowatt hour for the first 20 used in a month, but Union City has relatively few small users. Large consumption per capita has been encouraged by scaling the rates down sharply to a low of only 1.8 cents per kwh. for all over 60 kwh. The average rate paid by the consumer, consequently, is low. Fully 40 percent of the load is industrial and the city has encouraged industry by eliminating connected load and standby charges. Increasing use of electricity both by industrial and residential consumers together with the greater economy of the new Diesel are reducing the unit cost of producing a kilowatt hour. Since the plant already pays all the expenses of local government, the lower costs no doubt will result in reduced rates to the consumer. The power system is operated under the supervision of Superintendent W. W. Harper. Fundamental responsibility for power policy belongs to Mayor Lenwalice Case and Councilmen Edwin Merchant, Charles Lake, Estel Headrick, Charles Nelson, Buell Hamilton and Ralph Ford.

"SO SORRY, MR. TOJO"

ENEMY ships on the seven seas are finding the sting of America's submarines deadly.

Someone has said that when it can be told, we will hear an epic story of the work of our undersea fleet.

In part, the performance of these vessels traces to their Diesel engines. These give them their long range, and ability to stay at sea for months on end.

And if you could examine these engines, you'd find many marked with a familiar name — a name found on the engines of hundreds of Army, Navy, Coast Guard and commercial boats — the General Motors Diesel.

CLEVELAND DIESEL ENGINE DIVISION · *General Motors Corporation*

GENERAL MOTORS

DIESEL

LARGEST GAS ENGINE GENERATING PLANT IN THE WORLD

By WARREN GLEASON

BUNKIE, a small city in Louisiana and located about one hundred and fifty miles northwest of New Orleans, has an unique claim to fame in the engineering world. Using heavy duty type engines burning natural gas for fuel, the power plant at Bunkie is the largest of this description in the world.

For this there are several reasons. In 1928, a small plant requiring only a pair of 450 hp. Worthington Diesels was supplying the needs of the community and adjacent farm country. Natural growth of good farming country has added to the consumer demand. The establishment of army camps within a possible serving radius is another factor. One other reason, however, is the immediate proximity of producing natural gas fields, plus the far-sighted reasoning of the Superintendent of Production who was able to appreciate to the fullest the economy and efficiency of natural gas fuel when burned in a suitable internal combustion engine. Savings in operating costs have enabled this company to increase its service and its plant accordingly, and thereby, to take advantage of today's enormously increased demand.

E. Hogge, Superintendent of Production of the Louisiana Ice and Electric Company, Inc., who has served in this capacity for seven years, says he was "acquired" by the corporation along with the Bunkie plant when it was taken over by them. Mr. Hogge's office is in Alexandria, about thirty miles away. The corporation sells ice, water, and electricity; ice manufacturing plants are operated in Alexandria, Bunkie, and in Wichita Falls and Denton, Texas. Electric plants are located at Bunkie and Pineville, Louisiana; the heavy load falls on Bunkie, with the Pineville plant operating only as a stand-by in case of line failure. The current from the Bunkie plant is distributed over a wide radius of farms and communities from Ville Plate to Colfax, Louisiana, excluding the city of Alexandria which has its own municipally owned plant.

The Bunkie plant uses three 1000 kw. generating units, also one of 1250 kw. and one of 1500 kw. Each of the 1000 kw. generators is driven by a pair of 750 hp. Worthington gas engines with the generator direct connected in line between the two engines, or, as Mr. Hogge prefers to express it, it's one 12-cylinder engine of 1500 hp. Cylinders of this model, identical in the No. 1, No. 2, and No. 3 units, are 18 by 25 in. and the engines develop their full power at 225 rpm.

The 1250 kw. unit is a similar twin in-line Worthington, with cylinders measuring 20 in. by 25 in. This No. 4 unit also operates at 225 rpm. No. 5 unit, the latest installed, is of twelve cylinders, also, of the same dimensions, but operating at 257 rpm. No. 4 unit develops 1800 hp; No. 5 turns out 2250 hp.

The three 1000 kw. units were installed in November, 1938, about three years after the acquisition of the Bunkie plant by Louisiana Ice and Electric Company and after the need for material expansion was definitely proved. The producing gas field of Cheneyville, Louisiana, is only 5½ miles from Bunkie. The Eola field is only three miles away. This available low cost fuel was too profitable to overlook, so Mr. Hogge recommended gas. The corporation installed the three Worthington units, and put in its own pipe lines from both gas fields; the two fields are also directly connected with each other by another pipe line, so uninterrupted gas supply is assured. And according to geological opinion, the gas fields are practically inexhaustible.

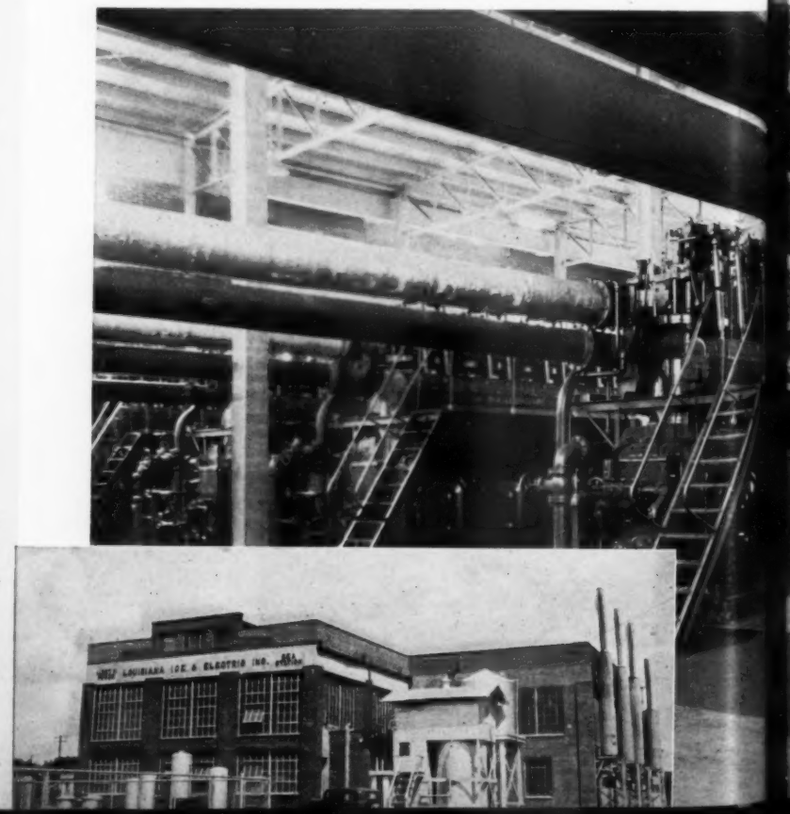
Herewith is shown the detailed data for the twelve-month period ending August 31, 1941. This detail includes only Units No. 1, 2, 3 and 4, as Unit No. 5 was not added to the plant until September, 1941.

LOUISIANA ICE & ELECTRIC COMPANY, INC.
REA Electric Generating Station, Bunkie, La.
MONTHLY ELECTRIC STATION PRODUCTION COSTS AND STATISTICS

	12 MONTHS ENDING AUGUST 31, 1941
GENERATING DATA	
Rated Capacity of Station	4,250 kw.- 80% PF
Gross Generation*	18,697,878 kwh.
Station Use*	611,862 kwh.
Net Generation	18,086,016 kwh.
Station Use	3.3%
Plant Running Capacity Factor	79.8%
Total Capacity Availability Factor - Unit #1	98.7%
Unit #2	99.7%
Unit #3	99.0%
Unit #4	99.2%
OPERATING RESULTS	
Total Gas Used	200,404 mcf.
Average btu. Per Cu. Ft. Gas	1,164 btu.
Gas Per Net kwh.	11.80 cf.
Btu. Per Net kwh. Generated	12,571 btu.
Net Station Thermal Efficiency	27.2%
FUEL COST	
Cost Per mcf. Gas (Cents)	4.94
Cost Per 1,000,000 btu. (Cents)	4.24
PRODUCTION COST	
Supervision and Labor	$12,207.83
Fuel	9,896.97
Lubrication (5,238 Gallons)	2,304.59
Water and Miscellaneous	1,763.90
Maintenance Labor**	2,383.10
Maintenance Material**	3,128.08
Total Cost	$31,684.47
PRODUCTION COST PER NET KWH. (MILLS)	
Operating Labor	0.67
Fuel	0.55
Lubricating Oil	0.13
Water and Miscellaneous	0.10
Maintenance Labor	0.13
Maintenance Material	0.17
Total Cost Per Net kwh.	1.75

*NOTE: *Exciters are link belt driven, therefore energy requirements are in addition to figures recorded.*
***Maintenance costs cover the entire plant operation and are not broken down to any specific part.*

Each generating unit consists of two Worthington, 6-cylinder gas engines with direct connected generator between. Insert, below: exterior view showing Maxim exhaust silencers and American intake air filters.



Using oil fuel and straight Diesel operation, a fuel cost of $0.003 per kwh. is about the best that can be ordinarily hoped for, in his opinion. With his gas-operating cost of .00055, a saving of .00245 runs up into money when the kwh. production runs well into the millions. A cost sheet of this sort is the reason why the No. 5 unit was installed in the fall of 1941. Excellent lube oil economy has been realized. A De Laval centrifuge is used for batch cleaning lube for the entire battery of engines and lube is changed either every six months or when chemical analysis shows excess acidity.

Concerning engine wear, the facts are equally interesting. Engineer L. J. Landry at the Bunkie plant keeps very accurate records. Every unit is completely dismantled for general inspection annually—every part is micrometer-checked for wear. As a sample figure, a cylinder of Unit No. 1, which measured 18 in. by 25 in. when new, showed on its last annual inspection a diameter of only 18.0025 in., a remarkably low rate of wear. A couple of new piston rings represented the only parts expense for the year's overhaul. On Engine No. 2, one cylinder showed a wear of .003 in. and four new rings were installed.

"As the engineer in charge here at the plant, what's your opinion of gas operation?" Mr. Landry was asked. He replied with a grin and a pat on the record-book. "That's the answer."

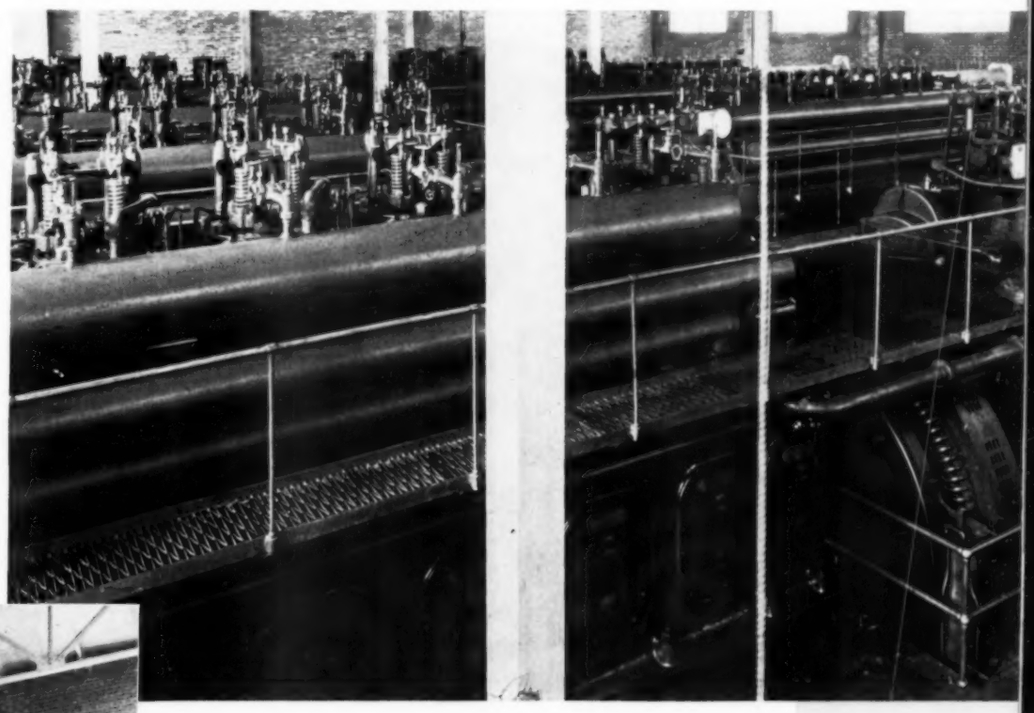
Low compression is also reflected in the quiet and practically vibrationless operation. The only way a layman can tell whether or not an engine is running is to look at the generator or dials. Plant construction, says P. E. Randol, in charge of Bunkie operations, is another vibration-reducing factor; the engine room, measuring 100 ft. by 100 ft., has an 8 ft. slab of concrete for a floor which rests upon pilings on 4 ft. centers, driven 30 ft. into the ground.

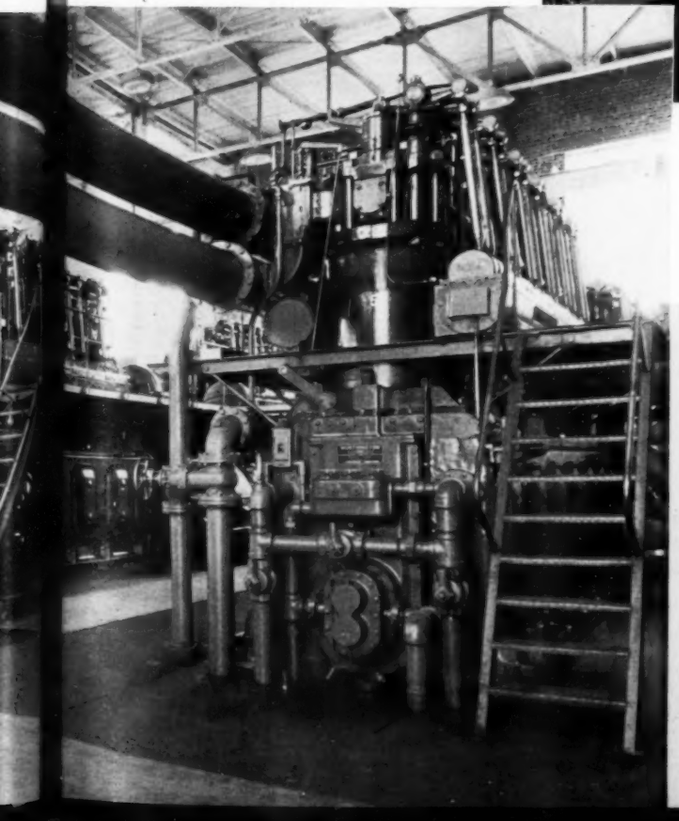
Natural gas comes to the Worthingtons at a pressure of 8 oz., reduced from the 125 lb. pressure in the mains. Each cylinder has its individual mixing valve; these valves are manually controlled and are adjusted according to load on the engine. Spark plug ignition is supplied, using Willard batteries and Worthington designed distributors built by Scintilla.

American intake air filters are fitted to all engines, with apertures outside the building. Maxim silencers muffle all exhausts. Woodward governors and Manzel lubricators are found on all five units. A separate pump is installed for circulating cooling water for each engine. Driven by G-E and Westinghouse electric motors, there are three 1200 gpm. pumps and two of 600 gpm.

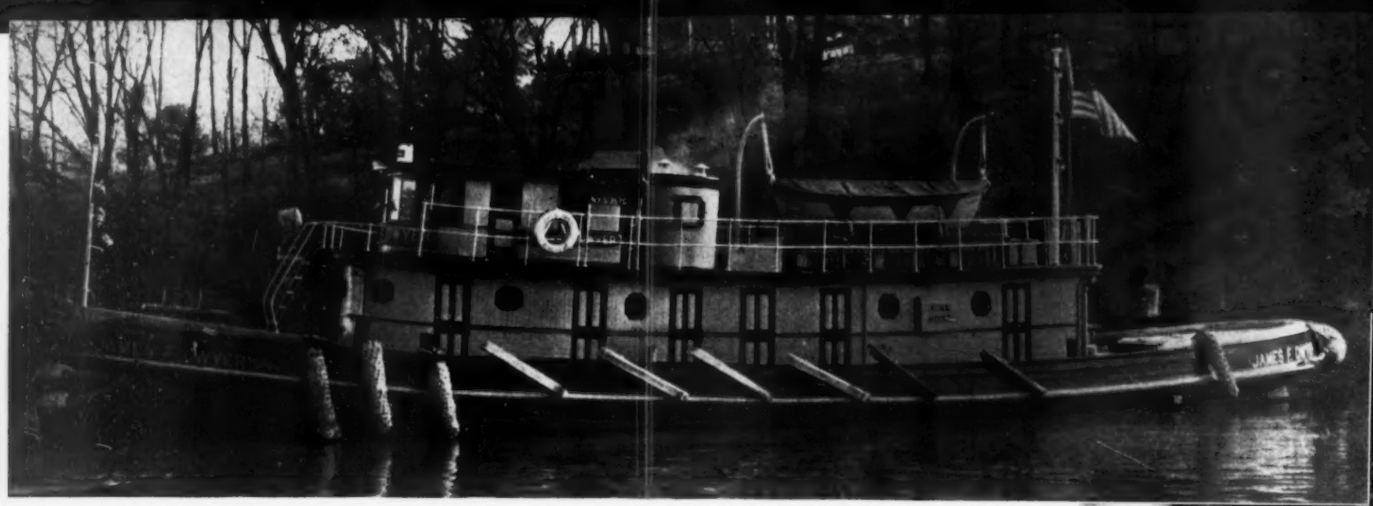
The ice plant serving Bunkie is a part of this plant, occupying a building adjoining the engine room. Three compressors, a 7½ in. by 7½ in. Vilter, an 8 in. by 8 in. Frick, and a 9 in. by 9 in. York are installed, giving a production of about 25 tons of ice daily.

Electric current as supplied from Bunkie is principally for domestic and commercial use. There is little industrial use throughout the area served.





Above: A veritable forest of engines is seen in this general view. The five, double engine units total sixty cylinders developing 8500 hp. Below: The battery of motor-driven pumps for circulation of jacket cooling water.



The tug "James F. Dwyer" in the Hudson River at Kingston, New York, after conversion to Diesel.

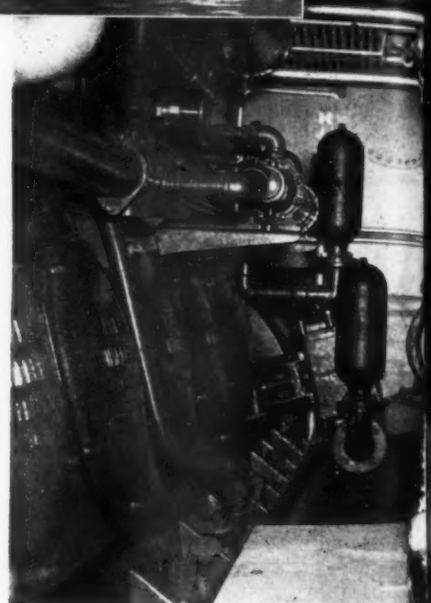
THE Harbor Towboat Co., Inc., a subsidiary of Dwyer Lighterage, Inc., 40 Water Street, New York, recently placed in commission the tug *James F. Dwyer* after extensive alterations and conversion from steam to Diesel propulsion at the yard of the R. Lenahan Company, another subsidiary, in Kingston, N. Y.

This tug, built in 1904 at Tottenville, N. Y., and named the *Dr. Geo. J. Moser,* was acquired by the Dwyer interests four years ago. She is a wooden vessel of the following registered dimensions, length 69.7 ft., beam 20.7 ft., depth 9.0 ft.

Originally, Mr. M. G. Kindlund of Kindlund & Drake, Naval Architects, was retained to make a survey of the possibilities to utilize the boat for future operation and it was decided to select a 400 hp. Atlas Imperial Diesel for conversion from the steam equipment that had become inadequate. At this point, William J. Dwyer, in charge of the R. Lenahan Company yard, had the tug removed to Kingston, N. Y., to have the out-dated steam equipment removed. After this had been done, the boat was taken to the Island Dock, Inc., dry dock to have necessary under-water work done. Upon examination it was the consensus of the surveyors that the hull below the water line was practically as good as new, but the top work, consisting of knees, clamp and plate, needed complete renewal. Due to war conditions, the Dwyer interests realized that a new hull was impossible to obtain. As the Atlas Imperial engine and other equipment had already been purchased, it was imperative that something be done. An inventory of white oak, yellow pine, etc., at the R. Lenahan Company Yard showed that while the stock was not large enough to build a new hull, it was ample to reconstruct the present one. This having been completed, the hull was returned to the Island Dock, Inc., where the special steel bed for the engine was installed as was the tail shaft, wheel, rudder, and other under water work.

The tug once more returned to the R. Lenahan Company yard where the process of installation was started and carried on to completion. It is due largely to the efforts and consistent application of William J. Dwyer to the many details involved that the tug today is an unquestionable asset to the owners.

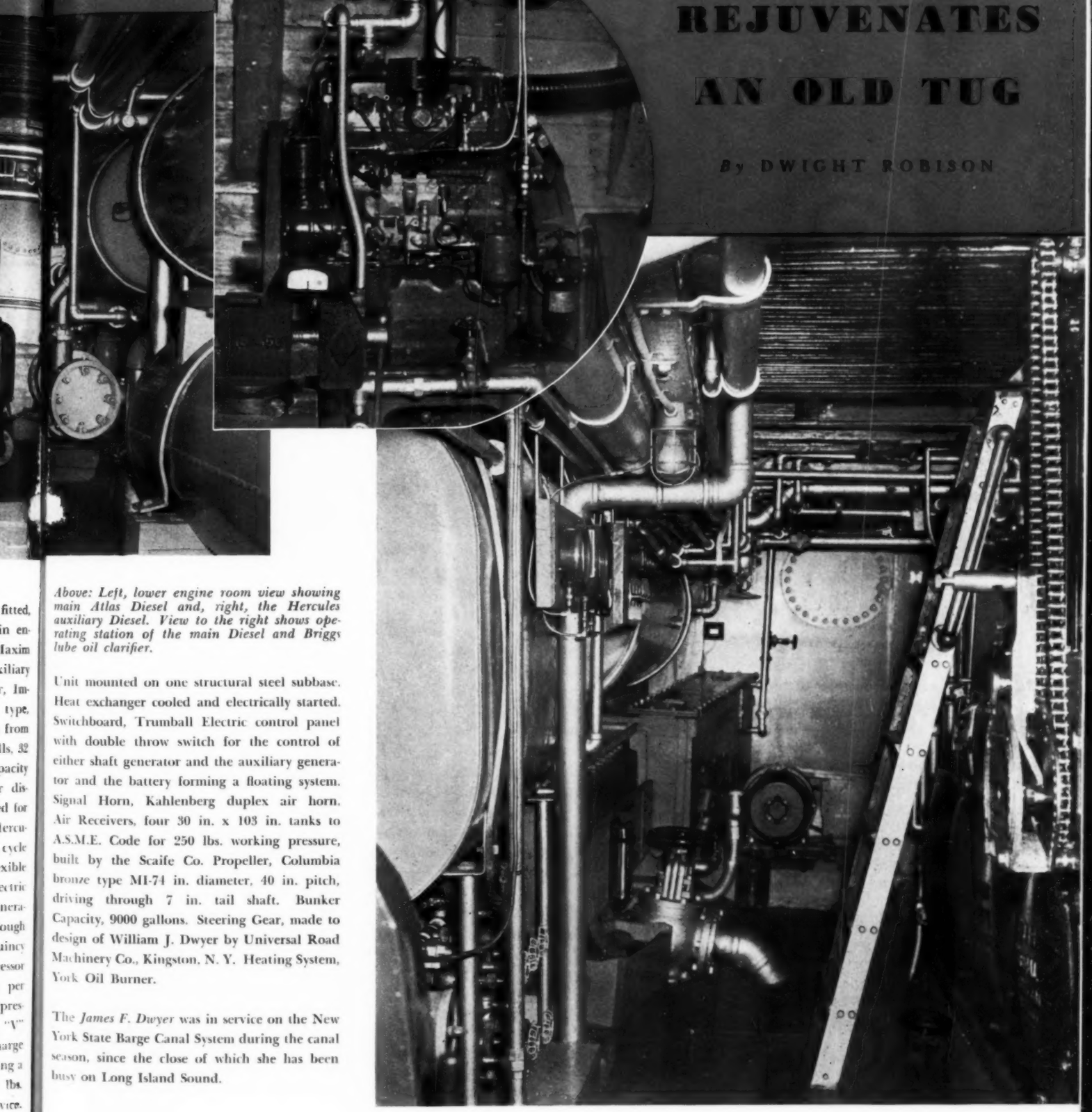
On the trial trip on the Hudson River, November 8, 1942, the most striking performance was established maneuvering the tug from full speed to a dead stop within twenty seconds. Likewise, when putting the tug through her paces, the air motor operated steering gear designed by William J. Dwyer left nothing to be desired. It was a revelation to see this effortless performance of a heavy tug turning around in an unusually small radius at normal speeds. The following equipment was installed on the *James F. Dwyer* in connection with conversion from steam to Diesel: Main engine, six cylinder Atlas Imperial, four cycle, solid injection type Diesel, direct reversible, marine engine, 13 in. bore, 16 in. stroke, rated to develop 400 hp. at 300 rpm. Thrust Bearing, Kingsbury, inbuilt on main engine. Air Compressor, single stage, inbuilt on main engine and driven by eccentric on crankshaft, displacement 19.6 cfm. at 300 rpm. Control, single lever, automatic maneuvering air ram inbuilt on main engine. Atlas Imperial design. Exhaust Pyrometer, Alnor, six circuit, with dial mounted on main engine gauge board. Tachometer, Weston Electrical, with dial mounted on main engine gauge board. Alarms, Brown Automatic System for lubricating oil pressure and cooling water temperature. Cooling System, Heat Transfer Products shell and tube type heat exchanger. Raw water pump 3½ in. suction, 3 in. discharge Weinman reversible, all bronze, centrifugal type. "V" belt driven from intermediate shaft.



Fresh water pump, double acting, bronze fitted, piston pump driven by eccentric on main engine crank shaft. Exhaust Silencers, Maxim spark arresting type, for main and auxiliary units mounted in stack. Shaft Generator, Imperial Electric 3 kw. 32/40 volt marine type, drip proof, variable speed, "V" belt driven from intermediate shaft. Storage Battery, 16 cells, 32 volt, Exide Ironclad marine, having a capacity of 252 ampere hours at the eight hour discharge rate. Oil Clarifier, Briggs, connected for continuous operation. Auxiliary Unit, Hercules four cylinder, 3¾ in. x 4½ in. four cycle Diesel, engine direct connected through flexible coupling to 5 kw. 1200 rpm. Imperial Electric marine type, drip proof, 32/40 volt D.C. generator with extended shaft connected through clutch and "V" belt drive to No. 340 Quincy two stage 5¼-3 x 3½ in. air cooled compressor having a displacement of 40 cubic feet per minute at 820 rpm. and 250 lbs. working pressure, also connected through clutch and "V" belt drive to a 2½ in. suction, 2½ in. discharge Viking bronze fitted rotary gear pump, having a capacity of 90 gpm. at 300 rpm. and 100 lbs. working pressure for bilge and general service.

DIESEL REJUVENATES AN OLD TUG

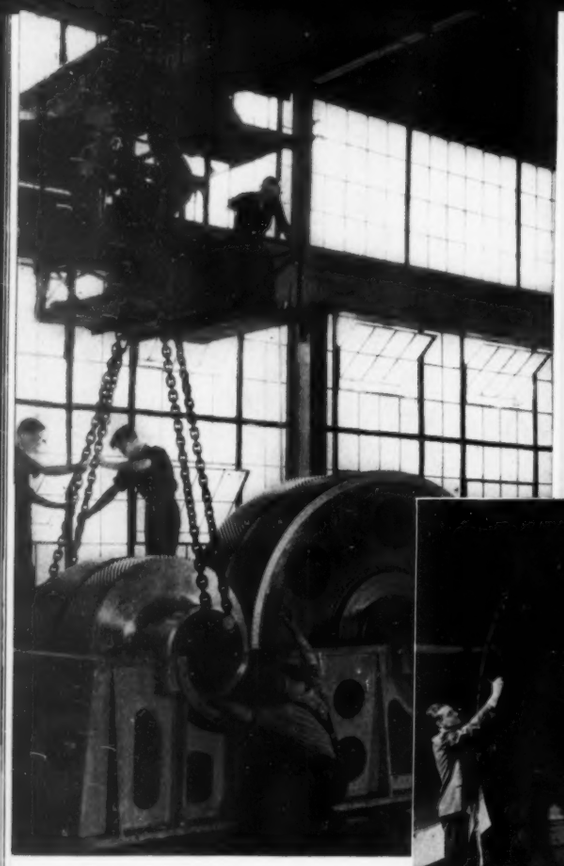
By DWIGHT ROBISON



Above: Left, lower engine room view showing main Atlas Diesel and, right, the Hercules auxiliary Diesel. View to the right shows operating station of the main Diesel and Briggs lube oil clarifier.

Unit mounted on one structural steel subbase. Heat exchanger cooled and electrically started. Switchboard, Trumball Electric control panel with double throw switch for the control of either shaft generator and the auxiliary generator and the battery forming a floating system. Signal Horn, Kahlenberg duplex air horn. Air Receivers, four 30 in. x 103 in. tanks to A.S.M.E. Code for 250 lbs. working pressure, built by the Scaife Co. Propeller, Columbia bronze type MI-74 in. diameter, 40 in. pitch, driving through 7 in. tail shaft. Bunker Capacity, 9000 gallons. Steering Gear, made to design of William J. Dwyer by Universal Road Machinery Co., Kingston, N. Y. Heating System, York Oil Burner.

The *James F. Dwyer* was in service on the New York State Barge Canal System during the canal season, since the close of which she has been busy on Long Island Sound.



Above: Pinion and Gear for marine reduction unit. Inserts: Outer and inner elements of electric coupling. Central view shows typical marine installation of Westinghouse electric coupling and gear.

Electric Couplings on Diesel Engines With Reduction Gear-Sets*

By JAMES A. WASMUND,†

ELECTRIC couplings are devices for transmitting torque, by means of electro-magnetic forces, in which there is no mechanical contact between the driving and driven members.

During the past three years, the United States Maritime Commission has put into service a large number of vessels propelled by Diesel engines connected to reduction gearing by means of electric couplings. The Westinghouse Electric & Manufacturing Company has provided or has on order at the present time electric couplings and coupling control for eighty-one vessels. Four of these ships are driven by four Diesel engines connected by four electric couplings and two pinion gears to a single propeller shaft. The remainder are driven by two Diesel engines connected by two electric couplings and two pinion gears to the propeller.

The electric couplings involved range from 4375 hp. at 180 rpm. with an outer diameter of 115 inches, to 1170 hp. at 350 rpm., 69½ inches in diameter. All are of essentially the same construction. Some of the advantages obtained by the use of electric couplings for ship drive are as follows: A number of engines may be used to drive a single propeller, and any engine or engines may be instantly connected or disconnected from the propeller shaft by operating a switch to close or open the coupling field circuit; space and weight are saved because the use of reduction gears permits the use of relatively high speed Diesel engines; Diesel engine vibrations are reduced to practically negligible magnitudes in the gearing; the maximum torque through the coupling is limited to approximately 150 percent of normal engine torque. If for any reason an engine seizes, the coupling will slip and not permit the remaining engines to damage it or the gearing; the electric coupling permits maneuvering by running one half the engines in an ahead direction, one half in an astern direction and alternately exciting couplings connected to these engines; since the coupling members are separated by an air gap, there is no mechanical contact and no wear.

The electric coupling consists of two fabricated steel spiders, rims, and flanges. On one rim, usually but not necessarily on the inside of the outer one, are bolted a number of field poles

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• *Paper presented at A.S.M.E.–63rd Annual Meeting, New York City.*

† *Marine Engineer, Westinghouse Electric & Manufacturing Company.*

which are excited, through collector rings, from a direct current source. In the larger sizes, the field coils are constructed of edge-wound copper strap while the smaller coils are wound with insulated wire. On the other element a laminated core, surrounding the rim, carries a double deck squirrel cage winding similar to that of the squirrel cage induction motor. The two elements are so constructed that one rotates inside the other, the two being separated from one another by a small uniform air gap. Either of the two elements may be connected to the engine crankshaft flange and the other to the gear pinion flange. In most cases, it has been found desirable to connect the inner element to the engine because it represents less overhung weight on the crankshaft bearings. In special cases, however, where it was desired to utilize the greater flywheel effect of the outer element, this member was connected to engine shaft.

The fundamental principle of the electric coupling is as old as the alternating current generator and motor, both of which it resembles. The transmission of torque from the driving element is similar to that of the squirrel cage induction motor except that the rotating magnetic field, in the case of the electric coupling, is produced by actual mechanical rotation of a constant direct current produced field rather than being set up in a stationary magnetic frame, by polyphase alternating current, as it is in an induction motor.

When an electric conductor is caused to move perpendicular to the lines of force in a magnetic field, an electro-motive force is set up in the conductor. If the conductor forms a closed circuit, this induced voltage causes a current to flow. When current flows in a conductor, there is always associated with it a magnetic field which surrounds the conductor and whose strength is proportional to the amount of current flowing.

Thus, in the electric coupling, the short circuited bars of the inner element have current flowing in them due to relative movement with regard to the magnetic field of the outer element. The magnetic field set up by this current is superimposed on the direct current magnetic field causing the resultant field on one side of the conductor to be strengthened and on the opposite side to be weakened. The conductors are acted upon by a force tending to move them away from the strong field and toward the weak field. Thus, the coupling driven element turns in the same direction as the driving element, the difference in speed (slip) being exactly that required to produce the torque demanded by the load.

The torque produced in the driven member is directly proportional to the induced current flowing in the rotor bars and the power factor. In order that the electric coupling may be used for maneuvering a ship, it must be able to produce relatively large amounts of torque at high slip. U.S.M.C. specifications require the coupling to produce at least 150% pull out torque as well as a minimum of 75% normal torque up to 140% slip.

The double deck rotor bar construction is used to produce high torque at extremely high slips, such as occur during reversal and starting the propeller from rest. When the slip is high, the induced voltage is at high frequency and the high reactance of the deep bars causes the current to be forced to the outer high resistance bars. Since the reactance of the outer bars is small compared to their resistance, the power factor is high and resultant torque high. When operating at normal slip, the frequency is low and the major portion of the current flows in the inner or low resistance winding, resulting in high transmission efficiency.

The couplings act as torsionally flexible members and torsional dampers. The pulsations in torque from the engines are smoothed out, reducing gear wear and noise and minimizing torsional vibrations in the driven system.

The use of electric couplings as disconnecting clutches is especially useful in multi-engine ships. The usual procedure when near a dock or when maneuvering in a close channel is to run half the engines ahead and half astern.

The ship can be maneuvered in either direction simply by operating a single lever which applies field current to the proper couplings, thus connecting the propeller to either the ahead or astern engines as required. All speeds except "Full Ahead" or "Full Astern" can be obtained without reversing the engines and without the use of any starting air, as the engines run continuously in one direction.

The couplings also permit any engine to be shut down for adjustments without having to stop the remaining engines. At the completion of the work, the coupling is energized again, it cranks the engine and the engine is back in service immediately.

It is quite feasible to design an electric coupling which may be used to adjust the speed of the driven load with a constant speed prime mover.

This can be done by using a wound rotor brought out to slip rings and external adjustable resistance. The efficiency of transmission, however, is reduced in direct proportion to the speed reduction, making this means of speed control unattractive except where very small amounts of power are involved.

The electric coupling has filled a definite need in the application of high speed engines to ship propulsion and will undoubtedly find favor in other applications where similar characteristics are required.

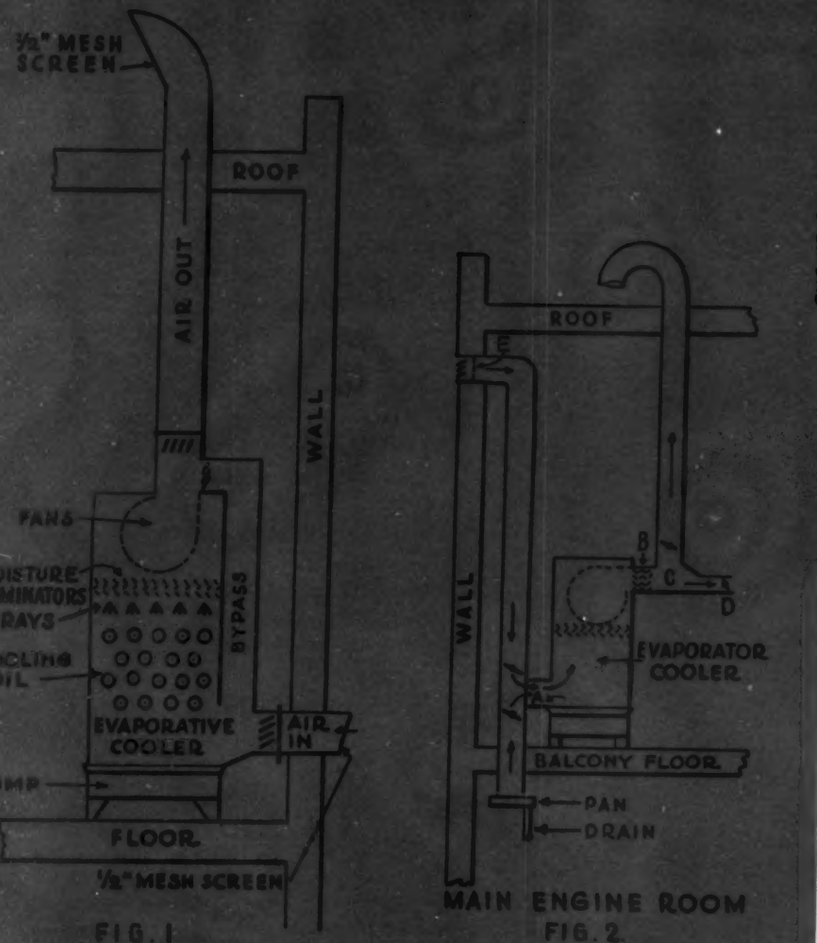


FIG. 1

FIG. 2

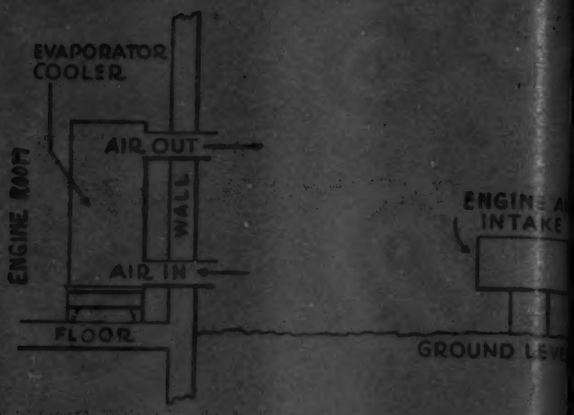


FIG. 3

INSTALLATION AND OPERATION OF EVAPORATIVE COOLERS ON DIESEL ENGINES

SINCE the many advantages of evaporative type cooling units for Diesel and gas engines have become better known, their use has spread rapidly. They are economical to install and maintain, have proved efficient in operation, occupy a minimum of floor space within or adjacent to the main engine room, and are readily fitted to closed cooling systems. Experience has shown, however, that to realize the best results with evaporative coolers, certain cautions should be observed in installation and maintenance of the units. The following notes and sketches emphasize some of the "Do's" and "Don't's" with respect to this important plant accessory.

The evaporative cooler should be installed in engine room under the eye of the operating engineer. Inside installation lessens danger of freezing, gives short runs of pipe, and low pumping heads. It should have automatic air dampers in air inlet and outlet to keep out cold air when cooler is shut down. If automatic dampers are not supplied, provide tight closing manual dampers and be sure to close them when cooler is off.

Air connections—Sketch No. 1 shows an ideal setup for air intake and outlet. Sketches No. 2, 3, 4, & 5 show some variations of bad air connections actually seen in the field.

No. 2 is very bad—Square duct corners and long runs restrict air flow. Additional restriction to air flow was added when additional moisture eliminator sections were installed in the fan outlets at B where the air may be at 2000 ft. per minute velocity. These are not necessary since eliminator sections below the fans and above the sprays are available and the air velocity here is only 400 or 500 feet per minute so that the air resistance offered is small and the eliminators are efficient; they are not efficient at air velocities above 600 ft. per minute. Also in the installation sketched in 2 there were three fans, and individual outlet ducts had been built for each fan instead of one large outlet duct for all three fans. This resulted in a high air velocity and high resistance to air flow through the outlets. The outlet at D was meant to supply heated air to the engine room, but it is impractical to use the air from an evaporative cooler for space heating since the air leaves the cooler at a high temperature and completely saturated with moisture. The moisture will condense immediately when this air strikes any object at a lower temperature. It will rust all metal objects, and take plaster and paint off almost anything.

The square air inlet duct corner was bad since the suction of the fans drew all the air through the top of the inlet and created a vacuum at the lower part of the air inlet at A strong enough to draw water back out of the cooler

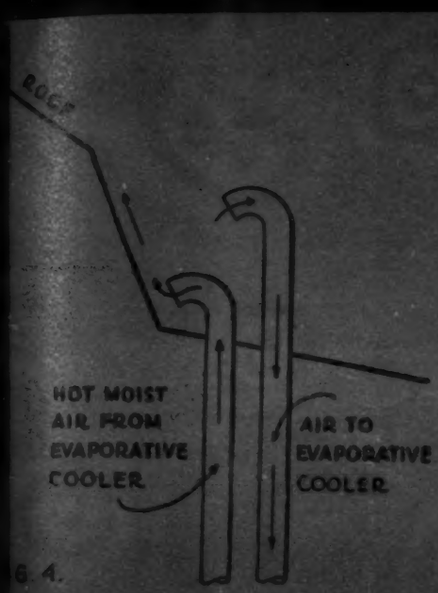


FIG 4.

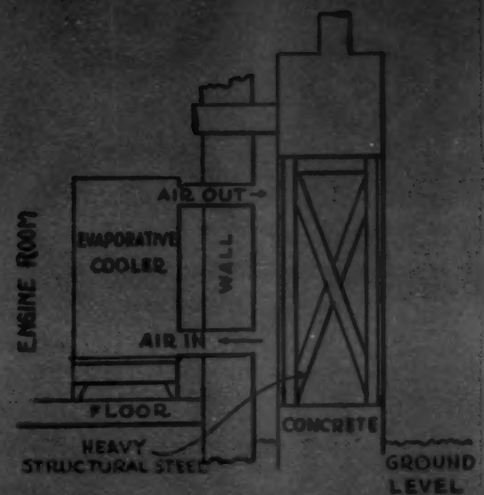


FIG 5.

Sketches indicate some "Do's" and "Don'ts" in typical installations of Evaporative Coolers.

ND MAINTENANCE OF

OOLERS FOR

NGINES

so that it ran down the air inlet through the balcony floor and onto the switchboards in the main engine room below. The pan installed below this duct opening stopped most of this, but so much water came out at times that the pan overflowed in spite of a ⅜ in. drain pipe.

On the installation shown in sketch No. 3 hot moist air from the evaporative cooler traveled to the engine air intake and froze on the screen so that it choked off the engine.

On the installation shown in sketch No. 4, the hot moist air discharged from the evaporative cooler was practically forced into the air intake of the cooler which reduced its cooling capacity to a fraction of normal.

On the installation shown in sketch No. 5, the air outlet and inlet were too close together resulting in recirculation of hot air and reduced cooling capacity. The recirculation was further encouraged by the maze of structural steel work in front of the duct openings, and by the fact that there were three evaporative coolers side by side inside the engine room so that the wind carried the hot air from one to the intake of the next.

Direction of rotation of evaporative cooler fans and spray pump is very important since both are very inefficient if running the wrong way. Most motors on evaporative coolers for Diesel Engines are 3 phase, and the interchanging of any two lead wires can result in wrong direction of rotation. All evaporative coolers should have arrows painted on the exterior to indicate the proper direction of fan rotation.

It is easy to tell if the spray pump is rotating in the proper direction. The point cannot be too heavily stressed since there have been repeated reports of evaporative coolers which did not develop their rated capacity after installation because the fans were running backward. This usually results in some very red faces among the installation and operating men who send in the kick on insufficient capacity.

We advise that hot water should be kept circulating through the coils of an evaporative cooler at all times in cold weather as insurance against frozen and ruptured coil tubes.

If an individual cooler is supplied for each engine in a battery, the piping should be cross connected so that hot water goes to all coolers even though only one engine is running at part load. Cross connection is also advisable so that each cooler may act as standby for the others.

Although motor or pump failures are rare, it is good practice to connect a city water line to the spray header for use in such an emergency.

An evaporative cooler is a very simple piece of machinery operating on simple principles, and with few moving parts. If it is properly installed and given a reasonable amount of attention, it should operate in a satisfactory manner for a very long period of time.

MARITIME "M" TO NATIONAL SUPPLY, SUPERIOR ENGINE DIVISION

Top view: Maritime Commission dignitaries and company officials on the platform as Governor Bricker of Ohio addresses employees and guests. Above: Rear Admiral H. L. Vickery congratulates Charles R. Barton, V. P. in charge of manufacturing. Below: President Alexander E. Walker of National Supply Company.

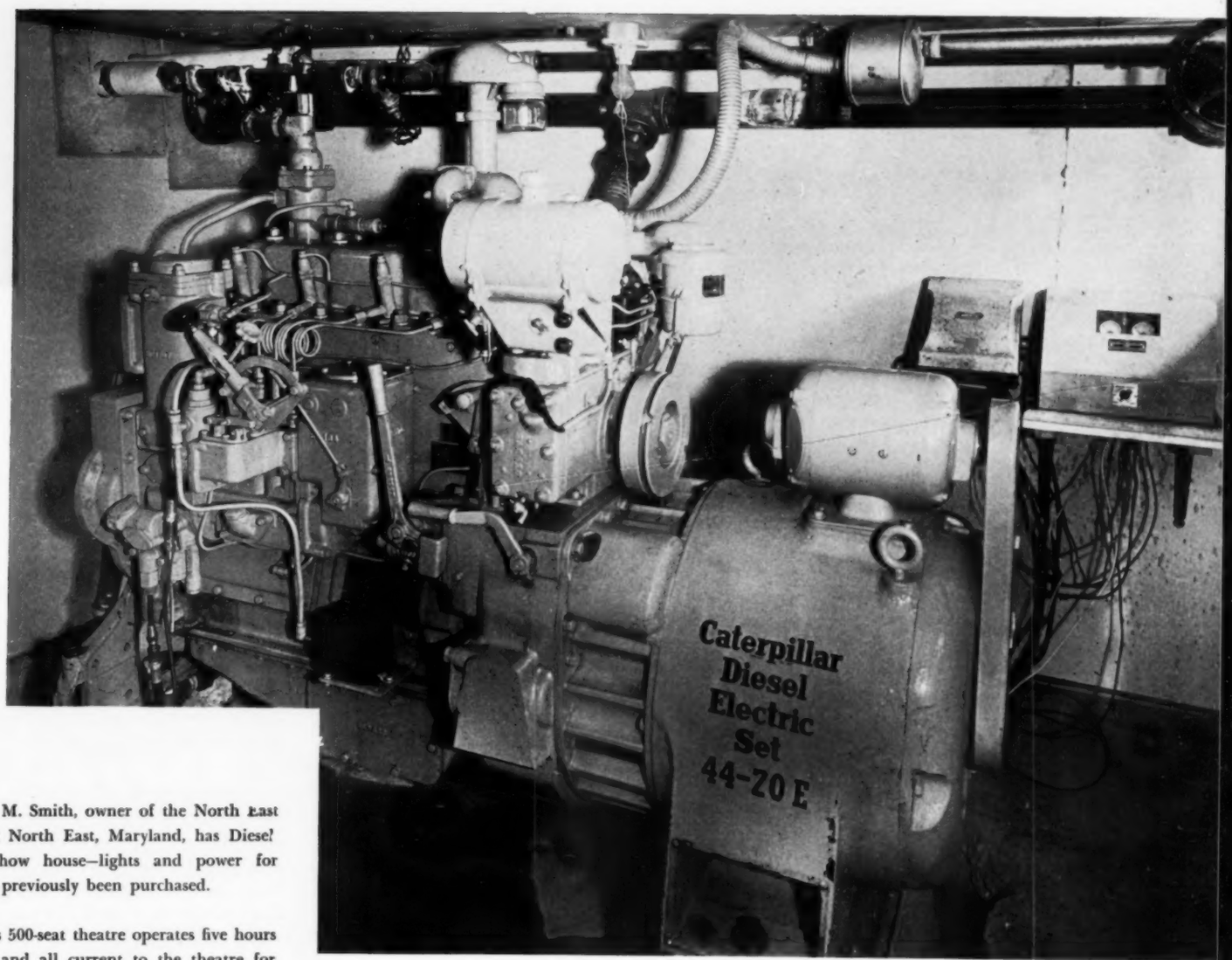
P. J. Shouvlin, left, founder of the Superior Engine Co. presenting the Maritime Merit badges to a group of veteran employees.

IN a colorful ceremony attended by more than three thousand company employees, Maritime Commission, Navy, State, City dignitaries and company officials, the Superior Engine Division of National Supply Company, manufacturers of Diesel engines, was honored in December with the award of the coveted Maritime "M" and Victory Fleet Flag, a noteworthy event. In making the presentation, Rear Admiral H. L. Vickery, Vice Chairman of the United States Maritime Commission said, in part, " . . . this year's shipbuilding objective of 8,000,000 tons . . . is in the bag and next year will more than double that. This remarkable record in ship building has been accomplished through the typical American qualities of inventiveness . . . this is the spirit which prevails among the employees and officials of the Superior Engine Division of National Supply Company . . . . . "

Governor John W. Bricker of Ohio in his brief remarks said . . . "In bringing the greetings of the State of Ohio to Springfield, I bring to you the greetings of millions of Ohio people who take pride in the achievements of this plant. The employees of National Supply have set a precedent and a mark of leadership in production to which others may aspire. . . ."

High spots in this impressive ceremony were the presentation of the Maritime Merit Badge to a group of veteran employees by P. J. Shouvlin, founder of the Superior Engine Company, and the acceptance of the Maritime "M" award by A. E. Walker, President of the National Supply Company who said, " . . . We are grateful for this recognition of a patriotic effort to serve our country in time of war . . . "

BETTER CURRENT FOR MOVIE HOUSE



JOHN M. Smith, owner of the North East Theatre at North East, Maryland, has Diesel ized his show house—lights and power for which had previously been purchased.

Mr. Smith's 500-seat theatre operates five hours every day, and all current to the theatre for air conditioning, projectors, heating, etc., is furnished by a Caterpillar Diesel-Electric Set.

According to the owner, the set gives 115 volt current not available before and the flow of current is more steady. What's more, the set uses but one gallon of 8.2c fuel per hour. The set was installed April 1, 1942.

This Diesel generating unit supplies current for all lighting and power requirements of the North East Theatre using one gallon of 8.2c fuel for a 5-hour run.

Above: This 500 seater at North East, Maryland, is typical of movie houses scattered across the country. This theatre has found Diesel-electric generation on the premises to be profitable and dependable. Left: The projection room is fitted with modern equipment.

Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department —mail your contributions direct to DIESEL PROGRESS.

Eliminating Excess Oil Accumulation Around Scavenging Pump Cylinder and in Scavenging Header

THE following item has been sent in by Mr. Virgil Knight of the Indianola, Iowa, Municipal Utilities:

"Excess accumulation of lubricating oil around the scavenging pump cylinder and in the scavenging header caused us considerable trouble on one of our two-cycle, air injection Diesels. This was a re-built job and it seemed to accumulate more oil at the above points than did some of our later units of the same make. We found that by neglecting to drain this oil off the scavenging header and the area around the scavenging pump cylinder for a few days, we would experience all the attendant troubles resulting from this oil being drawn over into the power cylinders.

"Several months ago we installed the system as shown in the accompanying illustration and this has cured our trouble. In accomplishing the removal of this excess oil, we removed the drain plug at the point around the scavenging pump cylinder, and also one at the opposite end of the unit in the scavenging header. With proper fittings, we then ran a small copper tubing drain from these two points down over the end of the engine, and made a tapped connection into the drain line from the wiper ring assemblies which carries this oil back to the dirty oil tank.

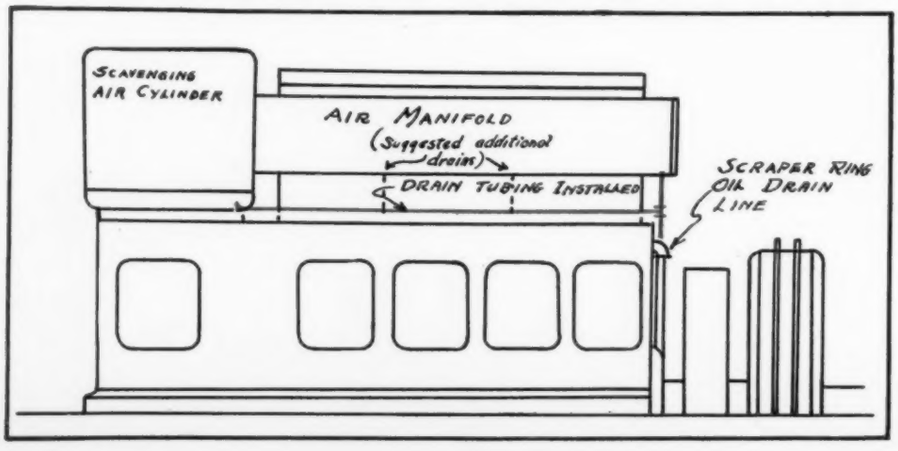
"We found that the two to three pounds of air pressure which we maintain in the scavenging header was sufficient to force this excess oil out through this newly installed line of tubing and, at the same time, found that the small amount of air required for this purpose had no appreciable effect in diminishing the scavenging pressure, there being little drop in the pressure due to leak off.

"In our particular case we made use of some old low pressure tubing which we had on hand from a rebuilding job. The tubing was of sufficient size to allow us to thread it with a standard ⅛ in. pipe die, so that we could use standard ⅛ in. pipe fittings in connecting up the job.

"Service representatives of the engine manufacturer have heartily endorsed this method of eliminating this trouble and months of satisfactory service have convinced us of its value. It will be noted that this oil being drained into the dirty oil line from the wiper ring assemblies is thus returned to our dirty oil tank. Hence, none of it is wasted."

Mr. Knight has made a good suggestion in eliminating this trouble and would have found it still more effective if he had installed additional lines as shown by the dotted lines in the cut. This would give him four points of drainage instead of two and, with the small sized tubing used, he would still find no apparent drop in the scavenging pressure.

There is still another way in which this problem can be greatly relieved by installing a breather above the sump in the crankcase and installing a manometer at the opposite end of the engine, with an opening into the crankcase so that you can determine the differential in pressure. This differential is determined by the size of the orifice in the breather, assuming that the screen in the breather is in fairly clean condition and also that your air filters are kept clean. This will be discussed under this section in the next issue of DIESEL PROGRESS and will be illustrated to show the proper method of installation. A combination of Mr. Knight's idea and the breather system make an ideal method for eliminating the above trouble.



Additional Information on Fuel Needle Valves

THIS department is in receipt of a letter from Mr. L. Muller Thym of the International Nickel Co., Inc., excerpts of which we are quoting below. Mr. Thym was prompted to write this letter by the contribution of Mr. Ernest Didier which appeared in the November issue of DIESEL PROGRESS:

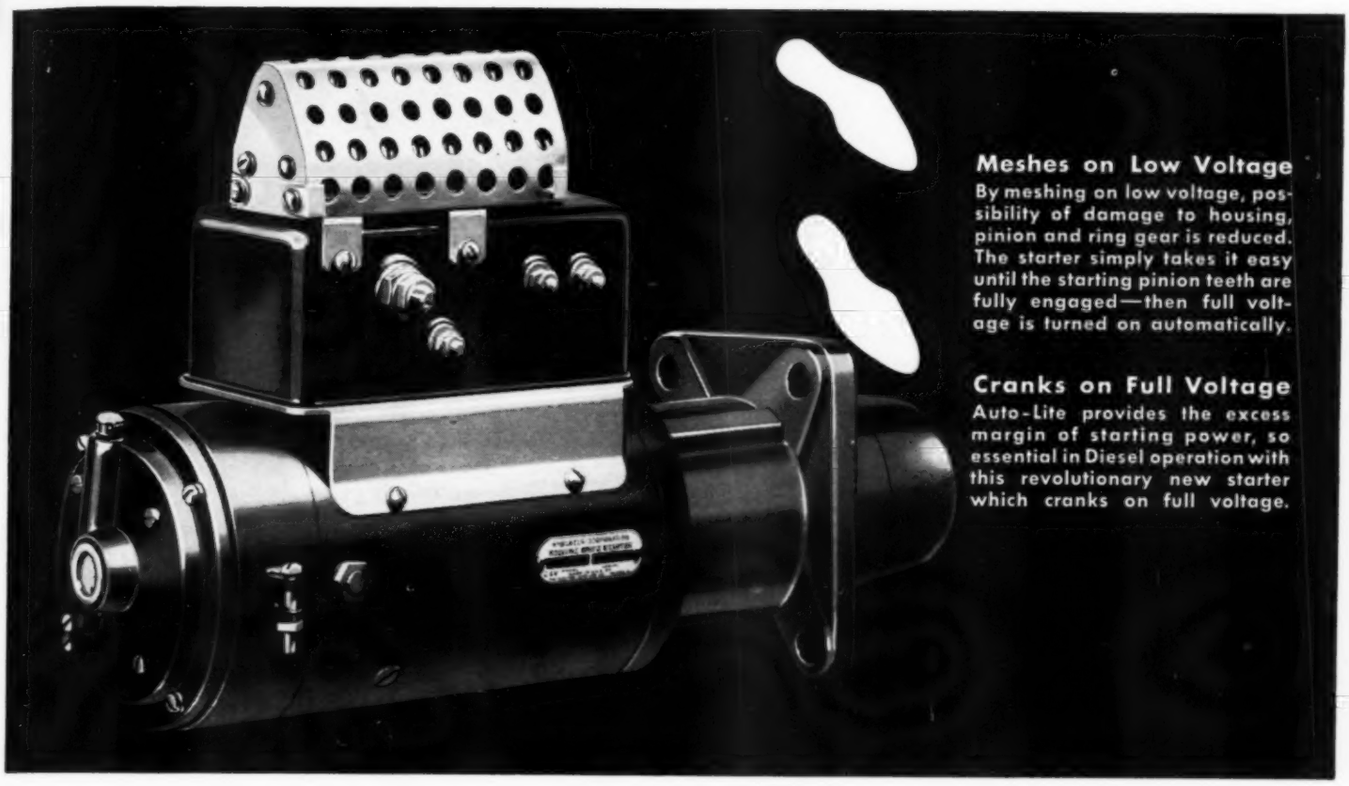
"My attention has been directed to your article on Page 59, of the November issue, describing in some detail a method of dressing and brazing corroded portions of fuel needle valves, after pitting at the point of contact with the valve packing.

"There seems to be nothing in the text which indicates the analysis or quality of the metal originally used for these needle valves. But, if such pitting is a common occurrence, the obvious answer would be for the engine manufacturer to use a metal immune to such inherent weakness.

"In a number of cases we have found that the corrosion of valve stems, pump rods, shaft sleeves, and other parts passing through packed glands is caused by acidulation of low grade tallow mixed with a graphitic form of inert carbon used as lubrication for the fibres of the packing. Such pitting may or may not be aggravated and additional galvanic effect developed if moisture is present.

"Such acid corrosion has even been reported on the shaft and shaft sleeves of stock model pumps while sitting on dealer's shelves after the gland packing may have been wetted during initial stock tests. One answer is to use a corrosion-resisting metal, like Monel or "K" Monel which is free from iron and resistant to the particular acid conditions. Some of the specially high grades of nickel-chromium stainless steels are more or less resistant to these

. . . . *And now please turn to page 62* . . . .



Meshes on Low Voltage

By meshing on low voltage, possibility of damage to housing, pinion and ring gear is reduced. The starter simply takes it easy until the starting pinion teeth are fully engaged—then full voltage is turned on automatically.

Cranks on Full Voltage

Auto-Lite provides the excess margin of starting power, so essential in Diesel operation with this revolutionary new starter which cranks on full voltage.

AUTO-LITE

Two-Step Starter

Auto-Lite's two-step starter for Diesels protects Housings, Ring Gear and Pinion against damage. By using low voltage to mesh the pinion the starter simply takes it easy until starting pinion teeth are fully engaged and everything is set to overcome the high torsional load which is a function of Diesel starting. Then full voltage is turned on automatically and there is power and to spare for a fast, efficient start. You get quieter, surer operation and a system that is easy to maintain.

Auto-Lite starting and generating systems for Diesels are designed and built by the world's largest independent manufacturer of automotive electrical equipment.

Shunt generators for 6, 12 and 24 volt systems: 25 to 5000 watts capacities are provided. Auto-Lite Heavy-Duty Regulators have 3 units . . . voltage, current and cut-out relay . . . in one water and dust-proof assembly. Maintain voltage to plus or minus 2%. These regulators are integrally radio interference suppressed. For prices and complete details, write to:

TOLEDO, OHIO **THE ELECTRIC AUTO-LITE COMPANY** SARNIA, ONTARIO

AUTO-LITE SPARK PLUGS • STARTING LIGHTING • IGNITION BATTERIES • WIRE & CABLE

IN ITS 26 GREAT MANUFACTURING DIVISIONS, AUTO-LITE IS PRODUCING A LONG LIST OF ITEMS FOR AMERICA'S ARMED FORCES ON LAND, SEA AND IN THE AIR

Comparing the Merits of Lubricants by Testing Under Actual Operating Conditions

By R. L. GREGORY*

MOST every Diesel Engineer and Operator has his own ideas and theories on the subject of lubricants, and seldom will you find two engineers whose ideas coincide on the matter of lubricants and lubrication. Most engineers do prefer, however, to determine the merits of competitive lubricants by the "cut and try" method under the actual operating conditions. Not long ago the writer heard a lubricating engineer talking with a plant engineer and heard him make the following suggestion: "Why don't you fill three of your lubricating units with the cylinder oil I am offering you, and operate the other three units with your present oil. This will give you three cylinders on each oil and, after a few weeks' operation, you can make an inspection of your liners and pistons and thus compare the merits of both." Taking into consideration the factors which govern a field test on lubricants, the fallacy of such a suggestion would be seen immediately, since a true comparison of the merits of the two lubricants could not be obtained in this manner. In order to obtain a true test, fair to both oils, it must be remembered that the test should be made under operating conditions as nearly uniform in each case as it is possible to have them. Herein lies the trouble.

We are all aware that the amount of wear on liners, pistons, and rings of a Diesel vary from cylinder to cylinder, the same as they vary on cylinders of different units. There will be a variation on ring fit, ring gap, and liner wear which will vary the amount of blow-by on each cylinder. This variation in the amount of blow-by will in turn affect the amount of power loss from cylinder to cylinder. Consequently, we can see that the conditions on one set of three cylinders, lubricated by the one oil, will not be identical with the three cylinders lubricated by the competitive oil.

You will also find a difference in the action of the fuel pumps and injection equipment, depending upon wear of the integral parts, adjustments, carbon formations, etc. Coupled with this is the chance of a variation on the point of fuel ignition, compression, maximum pressures, and firing. Here again would be reasons why no true test could be so obtained.

Added to the above is the matter of cooling. Scale formations on some jackets, or partial obstructions on the cooling system of one cylinder might so affect the cooling of that cylinder, that the heat transfer would be somewhat impaired, causing a difference in temperature between cylinders. Such a condition would mean that the oil on the hotter cylinder would be placed under more strain in its functions than it would be on the cooler cylinder.

There are many such points which must be taken into consideration when making such a test and, in order to get as nearly true results as possible in a field test under actual operating conditions, the tests should be run consecutively on the same unit, all cylinders being supplied by the same make and grade of lubricant. In order to conduct such a test, an engineer should follow some such a procedure as the following:

First, be sure that the mechanical condition of your unit is the same or as near identical with each test; that is, all the mechanical parts which will in any way have an effect upon the operation of the unit are in uniform adjustment from test to test.

Secondly, ascertain that the feed of the oil is at the same rate in all tests. In so doing, you would necessarily desire to run the tests on as near uniform loads as possible, for comparison's sake. Should you be unable to hold the unit at a steady or base load and had to operate on a varying or swinging load, the unit should be operated as near as possible on the same varying load conditions.

Third, use the same kind and grade of fuel in all consecutive tests keeping your cooling conditions, adjustments, and all other matters a fecting operation as nearly identical as possibl Use an indicator and check your engine pe odically throughout the various tests. Watc your exhaust temperatures.

Fourth, run your consecutive tests for sam period of time. Upon completion of one te observations should be made as follows:

First, inspect your liners, pistons, and rings ascertain the amount and nature of the carb residue which has accumulated. This should b done especially around the rings. Note whet any of the rings are stuck and which ones a whether there is any accumulation of carb behind the rings, measuring this amount b weight. Also note whether there is any indi tion of the lack of lubrication.

Second, a thorough investigation of the con tion of the crankcase oil should be made ascertain the amount of sludge or residue whi has accumulated from the test. Some oils w sludge up and contain more suspended matt than others. If possible, the amounts of slud and deposits should be determined. Then, pri to running the next test, the crankcase shou be thoroughly cleaned.

Third, note the difference in oil consumpti if any. As stated previously, the feed shou be about the same, but if due to a differen in the lubricants or load operation it is i possible to feed at the same rate and amou without interfering with operation, then n this difference in consumption and the effec has had on lubricating conditions.

Fourth, inspect the exhaust ports and note t amounts of deposit from each oil. Samp from each test should be analyzed.

If you follow the foregoing procedure careful however, noting and tabulating your resu you may arrive at some most convincing con sions as to the relative merits of the oils tes

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* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

TEAM FOR A LEISURELY AFTERNOON

What a team they make — the American Ranger and the diesel engine in his landing barge!

Leisurely afternoon? Well, we don't mean *this* afternoon. Right now, there are tough hours and days ahead for them both.

We mean some afternoon in the future, when all the barges have landed, when all the beach-heads are mopped up, an afternoon when the guns are silenced and the Ranger and his diesel are back at their peacetime jobs again.

When that day comes, this man who is now a Ranger will enjoy new leisure. The engine will be shouldering more of his loads. Giving him better light, or transportation. Working long *engine-weeks*, so that he may work shorter *man-weeks*.

That's a post-war aim worth the best we've got to make it come true. It's worth our nights, and week-ends and holidays. We give them gladly. Rogers Diesel and Aircraft Corporation, 1120 Leggett Avenue, New York, N.Y. *Divisions:* Hill Diesel Engine Company, The Edwards Company.

ROGERS R D A **DIESEL AND AIRCRAFT CORPORATION**

Diesel Engines, 5 to 2000 h.p. » Gasoline Engines » Generator Sets » Generators » Power Units » Switchboards » Pumping Units » Hydraulic Aircraft Equipment » Recoil Mechanisms » Power Mowers » Power Brushes » Snow Removal Equipment Streamlined deluxe Railway Motor Trains » Diesel Locomotives

The G.E. 1942 Railroad and Industrial Review Says . . .

DURING 1942 twenty 2000 hp. Alco-G.E. Diesel-electric road locomotives for use in both freight and passenger service were placed in service, as were twenty more 660 hp. switchers. More than two hundred 1000 hp. Alco-G.E. switchers were delivered to or under construction for the railroads. The 44-ton Diesel-electric locomotive continued to gain in popularity; the most unusual application of such equipment was on the San Francisco and Napa Valley Railroad, where two units are equipped for multiple-unit operation.

The demand for industrial Diesel-electrics was the highest ever. About 300 units, from 25 to 80 tons in size, were delivered to vital war industries. Four standard sizes—25, 45, 65, and 80 tons—were adopted.

The eight-ton sealed-equipped mine locomotive showed great promise of bringing considerable standardization to its field, long famous for its multiplicity of sizes and types. More than half the units sold to coal mines in the past two years were of this type.

New Buda Dieselight Plant In Full Production

THE NEW BUDA DIESELIGHT plant, opened August 1, is now in full production building Diesel engine generator sets for the armed forces, and eventually for the domestic and foreign-trade fields.

The new plant, familiarly known as "plant number two," employs about 200 to 350 men in the generator division at peak production.

Occupying the ground which has long been Buda property, the DIESELIGHT building is located just north of the present thirteen-acre home plant at 154th street. The new buildings have 65,000 square feet of ground floor space and will increase Buda's land in use to approximately fifteen acres.

The DIESELIGHT plant has greatly increased Buda's facilities for present output of engine generator sets. Company officials regard it as a long-range project with a view toward further development of South and Central American trade and to greatly increased range in domestic use after the war.

Exchange Your Diesel Maintenance Ideas

. . . . *Continued from page 56* . . . .

conditions, but care should be exercised against being misled by the general term "stainless" which is so frequently used to describe a wide variety of different alloys having various degrees of resistance to widely assorted corrosion factors.

"Our particular point is that it might be considerably cheaper and quicker to make a new needle by threading and pointing a short length of cold drawn Monel rod of appropriate diameter than to spend so much time and effort on reclaiming a piece with doubtful service life thereafter. Present priority regulations might, of course, make it difficult to secure Monel for the intended purpose, but no objection seems to have been registered in this particular case."

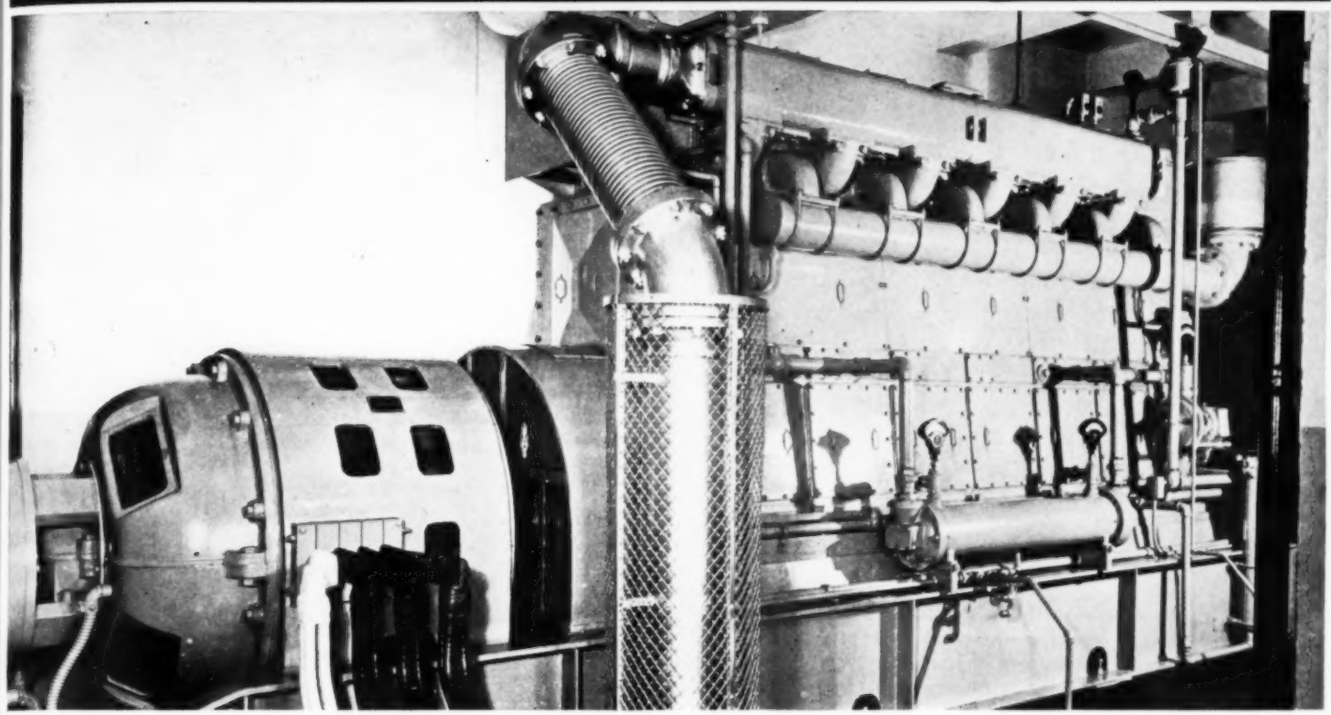
This department feels Mr. Thym has brought out a couple of worthwhile points in this letter which should be considered by engineers: That of using a better grade of metal in the making of these needle valves and, secondly, the comparative cost between making a new needle valve of proven material and the reclaiming of an old needle valve of doubtful service life thereafter.

There are also other points which Mr. Thym possibly has overlooked. Most manufacturers make needle valves out of high-grade metals since they realize the strain and wear to which these valves are subjected. And while Mr. Didier did not state the analysis of his particular needle valve rod, the writer does not question but what it was of a high-grade material.

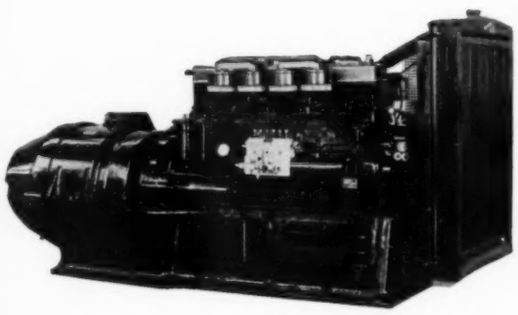
Very few needle valves become actually pitted. The wear which appears at the point of contact with the packing is not due so much to corrosive action from acids, as it is plain wear from the needle valve action passing up and down through the packing. You can take a valve stem, shaft sleeve, or any other moving part and construct it from the best of Monel or Nitroloy or high-grade "Stainless Steel" and the life of that part, moving through even high grade packing made with neoprene binder is limited depending upon the amount of stroke or revolutions of the part through that packing.

Of course, we are all aware of the effects of low grades of packing which, when in contact with moisture, produce an acid corrosion on these parts, and even with a good grade of packing, a Monel or Nitroloy sleeve or stem

AN OUNCE OF PREVENTION..



"AN OUNCE OF PREVENTION" becomes vitally important when the "pound of cure" may be unobtainable. Present day conditions demand that the full efficiency of your Diesel be maintained, by proper care and attention, in order that power for Victory may be continuous and uninterrupted. Lessened power, lost time and wasted money are the least of the inevitable results of laxness in engine maintenance.



Superior Diesels, sturdy and rugged as they are, nevertheless require regular attention — just as any other precision machinery. To this end we suggest that you call in the factory-trained service engineer, whose extensive experience enables him to make minor corrections or adjustments which, if done *in time,* may well prevent serious trouble or irreparable damage later.

SUPERIOR ENGINE DIVISION . . . THE NATIONAL SUPPLY COMPANY

SALES OFFICES: Springfield, Ohio; Philadelphia, Penna.; New York, N. Y.; Los Angeles, Calif.; Jacksonville, Fla.; Houston, Texas; Chicago, Ill.; Fort Worth, Texas; Tulsa, Okla.; Boston, Mass. FACTORY: Springfield, Ohio

will outwear one of bearing bronze or low grade steel, four to one.

Priority regulations at present will cut a figure in procurement of these high-grade materials and, when they are not available in such times as we are now experiencing, the Diesel engineer must use his own ingenuity to keep engines in operation. Therefore, while we thoroughly agree with Mr. Thym's suggestion, there are times when an engineer cannot immediately procure these high-grade metals and he is forced to do the next best thing by making use of the materials at hand.

Such suggestions as those herein given are the sort that we like to have from our readers, as eventually we shall bring all the points possible to obtain to bear on a given subject.

Diesel Maneuverability and Smokeless Operation Helps Deliver War Goods Through Danger Zones

THE importance of Diesel engine flexibility, affording the ability to out-maneuver axis submarines, planes and surface raiders, has been somewhat obscured by the splendid efforts being made by the United Nations' navies in convoying men and materials to our fighting fronts, according to T. F. Hudgins, vice president and director of The Cooper-Bessemer Corporation, Mount Vernon, Ohio.

But when the enemy does get within striking distance, it is gratifying to know that the fine maneuverability of Diesel craft can be used to good advantage in saving human lives and precious cargo. The flexibility, power, and positive control of Diesel engines permit a ship's speed or course to be changed quickly, thus making it less vulnerable to sea or air attack.

Lack of smoke in Diesel engine operation was another safety factor pointed out. Axis aircraft

Yours For Victory

Proudly we fly the coveted Army-Navy "E" flag with added star signifying continued compliance with requirements for over six months, presented to THE FULTON SYLPHON COMPANY for "... high achievement in the production of war materials."

The honor of this award is felt by every one of our employees. And it is a challenge to them to continue to earn this honor by adding service star after service star in the vital "battle of production."

FULTON Sylphon FOR TEMPERATURE CONTROL

Sylphon War Products include: Projectiles, Fuzes, Cartridge Cases; Parts for Depth Bombs, Mines, Torpedoes; Aircraft Engine Thermostats, Oil Cooler Thermostats, Fuel Pressure Regulating Valves; Parts for Super-charger Controls, Carburetor Controls, Fuel Injector Controls; Marine Controls for the Regulation of Heating and Ventilating, Fresh Water Heaters, Fuel Oil Heaters, Lubricating Oil Temperatures, Diesel Engines, De-superheaters, Steam Jet Ejector Condensers, Refrigeration; Engine Temperature Controls for Tanks, Combat Cars, Scout Cars, Transport Trucks; Industrial Controls for the Processing of Vital War Materials.

THE FULTON SYLPHON CO.

KNOXVILLE, TENNESSEE

Representatives in All Principal Cities in U.S.A. and in Montreal, Canada and London, England

and surface prowlers are always on the lookout for smoke to signify the location of a ship and the direction of its course. "The absence of smoke in Diesel-propelled boats has probably saved innumerable lives and thousands of tons of shipping," he said.

It is significant that the smokeless feature of Diesels received public recognition at the convention of the Smoke Prevention Association held in Cleveland June 2 to 5, 1942. During these meetings, it was emphasized how Dieselized railroad locomotives had been in operation for years without a complaint about smoke.

Current Issue of "On Land and On Sea" Carries Interesting Information

HONAN-CRANE Corporation's eight page publication entitled "On Land and On Sea," published regularly, furnishes data on oil purification installations in industry. Contents cover Diesel engines, turbines, hydro-electric generators, and a wide range of industrial uses such as hydraulic oils, insulating oils, cutting and grinding oils, and coolants, marine installations, fuel oils, etc. Current issue covers: Salvage operation at Glenn L. Martin plant, Story on Cranite, Complete oil purification at Arpee Screw Products plant, City of Columbus, Wisconsin, purification of Diesel lubricating oil, Enterprise Diesel equipped boats, purification of Crude and refined fuel oils. Write now for copy of the current issue to Honan-Crane Corporation, 600 Wabash Ave., Lebanon, Indiana.

Three Army-Navy "E" Awards To Fairbanks-Morse

THREE Army-Navy "E's" were awarded during the week of January 11 to the plants of Fairbanks, Morse & Co. at Beloit, Wisconsin; Freeport, Illinois; and Three Rivers, Michigan. Equipment built at the three plants of the company is used by the Navy, Army, Coast Guard, Maritime Commission, Air Corps, and the Treasury Department for Lend-Lease to the United Nations.

For many years, Fairbanks, Morse & Co. has devoted much of its engineering and production facilities to the production of equipment for our armed forces. After Pearl Harbor, the company immediately converted all of its manufacturing facilities to the making of vital war equipment.

In expressing his gratification over having his organization receive three "E" Awards at one time, Colonel R. H. Morse, President of the concern, said today: "Of course, we are pleased

Now there is a way to get better diesel performance

DIESEL FUEL *Concentrate*

Houghton's answer to the sticking valve, high-temperature, excess carbon problem.

Houghton's Fortified
DIESEL ENGINE OILS

Treated Lubricants for all Types of Diesel Engines, having:

TRIPLE FILM STRENGTH
HIGHER OILINESS
CORROSION-INHIBITING PROPERTIES
GUM SOLVENT ABILITY

Are you seeking a way to improve present fuel and its lubricating quality? Then investigate Houghton's Diesel Fuel Concentrate. This additive—used in the proportion of five gallons to each 1000 gallons of fuel oil—has been proven by users over the nation to—

- Decrease carbon and gum formation in the upper cylinder, valves and rings.
- Improve valve action by dissolving gums.
- Aid proper fuel injection.
- Keep nozzles free, permitting proper atomization.
- Protect against corrosion and minimize wear.
- Provide smoother, cooler, quieter running.
- Reduce maintenance costs.

We invite you to write for descriptive leaflet and prices on Diesel Fuel Concentrate, the answer to today's most crucial Diesel problem.

E. F. HOUGHTON & CO.

PHILADELPHIA CHICAGO DETROIT SAN FRANCISCO

and every man in this company has done his best to be deserving of these awards."

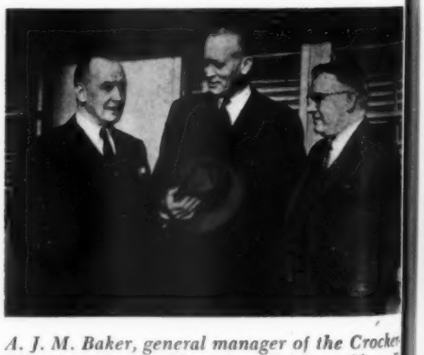
Supporting the armed forces of this country in time of war, however, is a strong tradition in this company. Since this organization was founded in 1830, they have been called upon to manufacture war necessities in four major wars, and each time this organization has done its best. They are following that tradition now in this fifth and greatest war in our history.

Joshua Hendy Acquires Crocker Wheeler, Pomona Pump, and Westco Pump Division

WHEN the story is written of how job shop production was converted to production en masse, the story of Charles E. Moore and his Joshua Hendy Iron Works will form one of the brightest chapters.

Initially assigned the task, by the Maritime Commission, of building 2500 hp. triple expansion steam engines for our new EC-2 freighters, the idea of producing these 271,000 pound monsters by mass production methods, instead of as individual jobs, did not cause the turn of a hair on Charley Moore's head. Starting with the purchase of the Joshua Hendy Iron Works, which was established in Sunnyvale, California, in 1856, he has put into war production the type and kind of plant facilities and organization that is a miracle of World War Two.

In achieving engine production to keep pace with ship launchings on the West Coast, there developed a number of bottlenecks in other types of necessary ship fittings and equipment, particularly in the line of steam turbines, pumps, motors and electrical control. Regardless of how good a ship's hull and engine may be and how quickly it may have been constructed, that ship cannot enter the service of supplying our navy, marine, and air force stationed all over the globe until all the other accoutrements have been designed, manufactured, and installed with the same precision and speed as were the hull and the engine. The Maritime Commission recognized this fact and again called on Charley Moore who jumped into the breach, this time purchasing the fifty-five year old Crocker-Wheeler Electric Manufacturing Company of Ampere, New Jersey. This concern is to be greatly expanded under the management of A. J. M. Baker, a former co-worker of Mr. Moore's, when both of them were assisting in the Lend-Lease program.



A. J. M. Baker, general manager of the Crocker-Wheeler Electric Mfg. Co. division, Chas. E. Moore, president of Joshua Hendy Iron Works and George A. McKenna, general manager of the Pomona-Westco Pump Co. division.

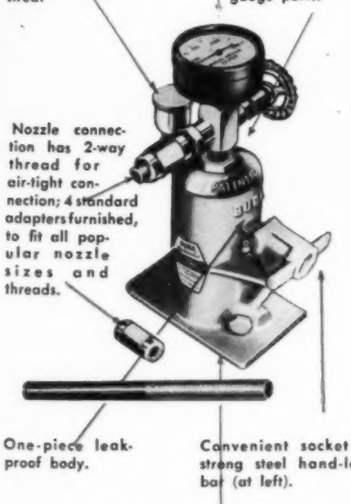
Mr. Baker was Deputy Director General of the British Purchasing Commission and Chief of the Machine Tool Division, while Mr. Moore served as expert advisor to the United States Government in the allocation of machine tools. Through acquirement of Crocker-Wheeler Electric Manufacturing Company, Hendy expanded their line from steam engines and steam turbines to turbo-generators, motors and other electrical equipment.

A PRECISION *Nozzle Tester* for only...

$35.00

F. O. B. Harvey, Ill.

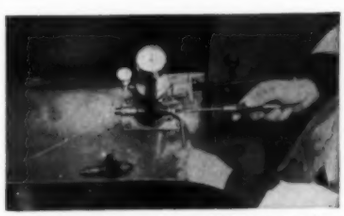
Check the features listed here . . . then send your order NOW!



WITH this simple, easy-to-use precision instrument you can set and adjust nozzles right on the job—keep your Diesel operating at top efficiency without costly downtime delays while you send nozzles to the shop for testing.

The BUDA Hydraulic Diesel Nozzle Tester is precision made for accuracy in testing, yet is rugged and simple in construction for long, trouble-free life. No technical knowledge is required for its proper use—any mechanic can make accurate tests and perfect nozzle adjustments by following the simple directions included with every BUDA Nozzle Tester.

Here's your complete portable "laboratory" . . . the 12-lb. BUDA Nozzle tester with all attachments in a sturdy, neat carrying case!



Picture shows easy adjustment of nozzle while mounted in tester.

THE BUDA COMPANY
Harvey (Chicago Suburb) Illinois

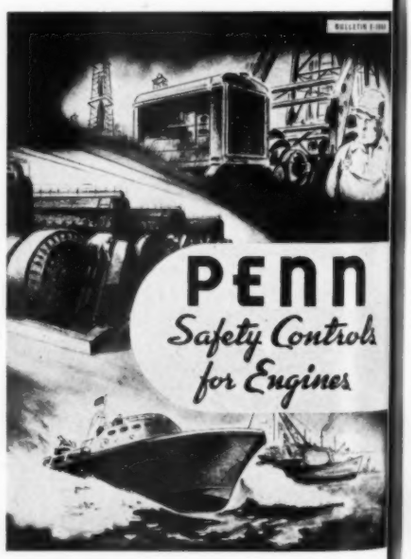
BUDA ESTABLISHED 1881

This still did not meet the urge in the mind of Charley Moore to break existing bottlenecks in shipbuilding, so he gathered into the fold the Pomona Pump Co. of Pomona, California, and St. Louis, Missouri, along with its subsidiary, Westco Pump Division. Pomona, over a period of forty years, and Westco, during the past twenty-five years, have built up a record of successful application of their pump in literally hundreds of industrial usages, as well as in agriculture, municipalities and marine service. Both were possessed of huge backlogs of orders for pumps for war service, but Charley Moore needed and, therefore, procured the Pomona organization and its "know how" in the design, manufacture, and application of a wide range of types and kinds of pumps. George A. McKenna, President, chief owner, and guiding genius of the Pomona Pump Co. since 1924, together with the entire executive personnel, has been retained intact by Moore. In addition to the plants in Pomona and St. Louis, an entirely new twenty-five ac plant located at Torrance, California, and pe fectly equipped for the manufacture of pump has been purchased and turned over to P mona Pump Co., Division of the Joshua Hend Iron Works.

By these purchases, consolidations, and acquisi ment of manufacturing and operating organi zations, Hendy has made sure that when the engines, regardless of the number produced month, go into a like number of hulls, the will be no undue delay in quickly commissio ing them for service. The design and manu facture of most of the critical items require now rests securely in the hands of capabl Charley Moore and his trained organizatio

New Engine Control Catalog Issued by Penn Electric Switch Company

A COMPLETE line of safety controls whic provide low-cost protection for engines is full described and illustrated in a new catalog re cently issued by Penn Electric Switch Co. Colo ful, attractive, and easy to read, the new six teen-page catalog covers single pole and double pole controls which sound an alarm, light a signal light, or, if desired, shut down the engin if the oil pressure drops dangerously low o bearings become overheated or cooling wate system fails.



The catalog incorporates large illustration showing both internal and external views o each particular model. One outstanding featur is the inclusion of a "Control Selection Guide which clearly gives the functions of each par ticular model depending upon its applicatio Thus, it is a simple matter to select the exa model to fit a specific job.

According to the manufacturer, Penn automatic engine controls are built in three basic models . . . combination pressure and temperature . . . oil pressure . . . and water temperature units. Models are also available for bearing temperature control and for protection of pressure lubricated machines. Controls in this series, states the manufacturer, are equally applicable to gas, gasoline, and Diesel engines, and are easily installed either on new engines or engines already in service.

Copies of this new catalog are available free upon request. Write Penn Electric Switch Co., Goshen, Indiana, and ask for Bulletin E-100A.

New Gulf Dieselube for Heavy-Duty Trucks and Tanks

GULF OIL CORPORATION has just announced a new brand of lubricating oils which it calls Gulf Dieselube H.D. (Heavy Duty). These oils are made to meet U. S. Army specifications for internal combustion engines for ground equipment as trucks, tanks and jeeps. Severe heavy-duty Diesel engine tests conducted by Gulf Research & Development Company, the research subsidiary of Gulf Oil Corporation which developed these oils in cooperation with the Lubricating Department, show them to be remarkable in engine cleanliness and prevention of ring sticking. They are detergent oils of the highest quality for use in bus, track, tractor, marine and industrial installations, as well as other Diesel engines for which manufacturers and operators demand detergent type oils which are non-corrosive to alloy bearings and which eliminate, as far as possible, ring sticking and engine deposits. They are also recommended for gas engines in commercial equipment where service is very heavy to overcome ring sticking, lacquer formation, and bearing corrosion.

World War I Aviator and Aeronautical Engineer Elected 1943 President of SAE

MAC SHORT, of Burbank, California, whose vocation is aeronautical engineering and whose avocation is designing and flying planes, was introduced as the 38th president of the Society of Automotive Engineers at the annual business session held in the Book-Cadillac Hotel, Detroit, January 12, in connection with the SAE War Engineering Production Meeting.

Mac Short

Mr. Short became an SAE member in 1925. In 1934 and again in 1941 he served as national vice-president for aircraft engineering, and in 1940-41 was chairman of the Southern California SAE Section.

The new SAE president has a background both of aeronautical engineering and flying, his ex-

4 NORDBERG DIESELS serve this Rural Electrification Project

A large portion of the normal load is carried by a five cylinder, 2000 H.P. Nordberg Diesel as shown above, the largest and latest unit to be installed at the Reeve generating plant.

We are proud to fly the Navy "E" with the added star signifying that excellence in production has been maintained.

An unusually successful record has been established by the Federated Co-Operative Power Association, a rural electrification project serving a half dozen counties centered around its generating station at Reeve, Iowa. The performance of this plant and its rapid growth is evidence of its success. Service was started in 1935 with two Nordberg Diesels of 750 and 1000 H.P. In 1939 a 1500 H.P. unit was added and in 1941 the latest addition of a 2000 H.P. engine was made, the plant now totalling 5250 H.P., being among the larger all-Diesel generating stations in Iowa. That Nordberg Diesels were selected when units of greater capacity were needed is evidence of the satisfactory service given by previous installations.

NORDBERG MFG. CO. • MILWAUKEE

NORDBERG MACHINERY

NORDBERG

DIESEL ENGINES

NORDBERG MACHINERY

perience beginning with his enlistment at the age of nineteen in the U. S. Army Air Service during World War I. He retired from active duty as a flying lieutenant shortly after the Armistice, and earned his way through Kansas State Agricultural College by barnstorming flights during weekends and summer vacations. He was graduated in 1922 with the degree of Bachelor of Science in mechanical engineering, and re-entered U. S. Army service at McCook Field, Dayton, Ohio, as junior aeronautical engineer. From 1925 until 1927, Mr. Short was an instructor in aeronautical engineering at Massachusetts Institute of Technology, where he also received his Master's degree. Thereafter Mr. Short devoted his attention to the design and manufacturing phases of aviation. He was instrumental in forming the Stearman Aircraft Co., of Wichita, Kansas, and for ten years was vice-president and chief engineer. In 1937 he organized and became president of Vega Aircraft Corp. of Burbank, California. He relinquished administrative duties in 1940 to devote his full time to aeronautical engineering and the further development of Vega-designed aircraft.

Army-Navy "E" to Fulton Sylphon

THE Fulton Sylphon Co. of Knoxville, Tennessee, is the proud possessor of the Army-Navy "E" pennant with an added star in recognition of sustained effort for six months. This concern is turning out a long list of war products for application on Ordnance, Aircraft, Naval Craft, Military Vehicles, Tanks, Merchant Vessels, and various Industrial Process Equipment. Many of its products, widely known in the Diesel field, are temperature and pressure controls which have been adapted to various war-time requirements to which the Company has added production of fuses, cartridge cases, projectiles, parts for bombs and mines, and automobile and tank engine parts.

Buda Appoints R. C. Wietersen

THE Buda Company announces the appointment of Mr. R. C. Wietersen, Director of Purchases. He is in complete charge of purchases of equipment and material for Buda gasoline and Diesel engines, radial Diesel engines, railroad equipment, lifting jacks, Dieselight generator sets, Earth Drills, and industrial shop trucks—all products of The Buda Company.

R. C. Wietersen

Mr. Wietersen is well known in the engine industry and has had considerable experience in this field. Mr. Wietersen for the past two years was Director of Purchases for the National Supply Company (Superior Engine) Springfield, Ohio. For four years prior to that he was with Hercules Motors of Canton, Ohio as Director of Purchases. He spent eighteen years with Studebaker Corporation, South Bend, ten of which he was Assistant Purchasing Agent.

Winslow Engineering Co.

MODERN oil filtration came of age last month when the Winslow Engineering Company formally opened its new plant in Emeryville, California, almost exactly twenty-one years from the time that Charles A. Winslow produced his first oil filter in a small plant in Vallejo.

Since that time, and largely under the capable direction of Winslow, filters have grown from small units built into automobile engines to giants capable of filtering 150 gpm. of fuel oil, a number of which were recently produced by the Winslow company.

This company is now producing oil conditioners, which recondition as well as filter lubricating oil, in types and sizes for all automobiles and a wide variety of marine applications, as well as for all trucks and tractors, also replacement elements for use in both its own and other makes of filters, and a broad range of fuel oil filters for Diesel engines.

Charles A. Winslow

Winslow equipment is standard on several of the powerful engines now being produced for the American and allied war effort, and is widely used in Government marine installations.

Charles A. Winslow is president of the company, L. L. Moore is vice-president and factory manager, W. G. Nostrand is chief engineer, and Mrs. Catherine Winslow is secretary and treasurer.

Federal-Mogul Elects E. O. Jones to Vice Presidency

ANNOUNCEMENT is made by the Federal-Mogul Corporation, Detroit bearing manufacturers, of the election of Edwin Olney Jones as a vice-president. Mr. Jones, who continues as sales manager of the company's original equipment division, has been associated with Federal-Mogul since the corporation's organization in 1924 and a director since 1929. Prior to that he was, since 1919, on the sales staff of the Federal Bearing and Bushing Company, one of the group which formed the corporation.

At the same directors' meeting, Guy S. Peppiatt was elected executive assistant to the president, H. Gray Muzzy.

E. C. Fink, Mack Truck President, Dies at 62

E. C. FINK, president and chairman of the board of Mack Trucks, Inc., died in New York City on January 1 following a heart attack suffered a few days earlier. He was 62 years old.

A pioneer in the truck industry, Mr. Fink had been an officer of the company since its organization in 1911 following a consolidation of the Mack Bros. Motor Car Co., the Hewitt Motor Co., and the Sauer Motor Truck Co. He was for many years vice president in charge of production at the company's plants in Allentown, Pa., Plainfield, N. J., and New Brunswick, N. J. In this capacity he supervised the development of Mack truck, bus and fire apparatus models over a period of years that saw far-reaching changes in the design and construction of motor vehicles and in the extension of their use. Mr. Fink was elected president and chairman of the board in January, 1937, succeeding the late Charles Hayden.

Born in Cincinnati, Mr. Fink started his career with the old machine tool firm of Lodge & Shipley, thus acquiring the practical first-hand knowledge of machinery that was to guide him so successfully as an executive. He later served with the Prentiss Tool and Supply Co. and the Stevens Arms Interests.

As head of Mack Trucks during the present war he was the guiding hand in the design of the specialized motor trucks Mack is supplying the armed forces and in the development of the huge Mack-built transmissions now used in many of the Army's 30-ton tanks. Shortly before his death, Mr. Fink had the gratification of seeing all three Mack plants presented with the Army-Navy "E" award for excellence in war production.

He is survived by his widow, Mrs. Clara Fink; a daughter, Mrs. H. Fillis; and a sister, Mrs. A. G. Sherman.

Mohammed Goes to the Mountain

CATERPILLAR Tractor Co.'s two traveling instruction schools have started a second tour of army camps to provide second echelon instruction for various United States Engineer units. Two Caterpillar Diesel trucks, loaded with electrically-operated cutaways, animated charts, motion pictures, slide films, and literature, departed simultaneously from Peoria, Illinois, and San Leandro, California, plants each manned with two service department representatives.

Instruction includes lectures and demonstrations on the construction, operation, lubrication, maintenance, minor adjustments and repairs of Caterpillar products. The truck from Peoria will travel 6,000 miles to visit sixteen camps in Kentucky, Tennessee, Louisiana, Mississippi, Alabama, Florida, Georgia, North Carolina, Vi

ginia, Connecticut, Massachusetts, and New York before returning in late April.

The San Leandro truck will journey 7500 miles in visiting fourteen camps in California, New Mexico, Colorado, Kansas, Oklahoma, Texas, Oregon, and Washington, concluding in mid-April. On a recent tour, these traveling schools provided three-day instruction at 28 camps. On the current trip each stay will be extended to four days.

New Vertical Rotary Pump

A NEW rotary pump vertically mounted and powered by a 15 hp. gearhead motor is now being built by the Blackmer Pump Company, Grand Rapids, Michigan, according to information released by J. B. Trotman, General Sales Manager of the company. Practically all of these pumps are going into marine construction and they are built to meet full Navy specifications. They are used for pumping Diesel fuel on combat and escort craft.

Due to the small floor space required for mounting, however, this same unit has been adapted for use in industrial plants requiring the transfer of oils and other non-abrasive liquids.

The general specifications are as follows: Capacity 100 gpm. at a pressure of 100 psi, handling Diesel fuel. The pumping unit is all bronze construction. The motor is standard gearhead type. 1770 rpm. reducing to 440 rpm. on the drive shaft. The base is fabricated steel, designed for bottom and back anchorage in mounting.

This unit is another in the series of pumps for marine and Diesel service that have been developed within the past year by Blackmer engineers and used in connection with the war effort. Mr. Trotman states that other pumps are currently completed and on test, and that further announcements concerning them may be expected.

Good Performance!

THE five Diesel-electric power units on the new Streamliner "400" fleet of the Chicago and North Western Railway Company will have piled up almost 1,000,000 miles with virtually no unscheduled interruptions upon completion of the first year of regular service January 12. Said L. L. White, chief operating officer of the railway company, in reviewing the performance of the power units during the past twelve months, "Aside from excellent performance, the power units made it possible to divert a number of standard steam locomotives for use elsewhere by the railroad. Coming immediately after the United States entered the war, the release of the locomotives, as well as other standard equipment, was particularly advantageous in meeting the rapidly increasing wartime transportation requirements.

"The units and streamlined cars were ordered early in 1941," he explained, "with the final power unit delivered in August of the same year, while the nation was still at peace and with Pearl Harbor several months away. Purchased and delivered primarily to meet peacetime requirements, the equipment from the first day it went into regular service has been an important contribution to the war effort."

Mr. White pointed out that the power units are averaging more than 500 miles a day, which does not take into consideration any time they

may have been out of service due to repair work which could not be performed during their regular layover at terminals.

"The past year has seen these units practically in continuous operation, with out-of-service time nominal due to efficient operation of the units in the shops as well as all along the line. Such work as changing motors and wheels and other necessary repairs was done largely during the layover periods in Chicago."

The five power units were ordered early in 1941 at an approximate cost of $900,000 and the final unit was delivered in August, 1941. Four were made by the Electro-Motive Corporation at LaGrange, Illinois, while the fifth was made by the American Locomotive Company at Schenectady, New York. The 2,000 hp. units have two Diesel engines and are similar in design to the units which have seen several years of service with the Streamliner Twin Cities "400".

The new fleet, which supplements the Twin Cities "400", consists of the Commuter "400", two City of Milwaukee "400s", Shoreland "400", Capitol "400", Peninsula "400", and Valley "400". The trains operate on daytime schedules between Chicago and Milwaukee and such points as Green Bay, Madison, Oshkosh and Manitowoc, Wisconsin, and Escanaba, Negaunee and Ishpeming, Michigan.

William Orwin Banta

WILLIAM ORWIN BANTA, 58 years old, sales manager of the replacement service division of the Sealed Power Corporation, died suddenly on December 31, 1942, at his home in Muskegon Heights, Michigan. He was born near Rensselaer, Indiana, and attended school in Chicago, later graduating from Valparaiso university.

Mr. Banta joined the staff of the Sealed Power Corporation in July, 1935, as district manager in California, becoming sales manager of the service division in 1937. He had previously been Indiana salesman for the Central Steel & Wire Company; western representative of the Spencer Smith Machine Co.; and had engaged in the jobbing business in Indianapolis under the firm name of Banta & Wilcutts.

New Data on Oilseals and Greaseals

"NEW DATA ON Oilseals and Greaseals" is the title of a new Bulletin which has just been published by the Gits Brothers Manufacturing Company, 1846 South Kilbourn Avenue, Chicago, Illinois.

This New Bulletin presents the latest detailed information, recommendations, applications,

diagrams, listings, prices, etc., on the broad line of Gits Oilseals and Greaseals, which are serving widely in Aircraft, Motorized Units, and in practically every branch of industry.

A copy of the New Gits Bulletin may be had, without obligation, by writing direct to the manufacturer.

West Coast Diesel News

THE human side of the news crops up now and then. The Hall-Scott Motor Car Co., Berkeley, California, has sent out 300 boxes of canned food, enclosing one in each crated engine going to foreign parts. There's a simple message on it asking that the contents be fairly distributed. Among the many letters of thanks received is one signed with the names of seventy-two workmen on the bleak, far shores of the Isle of Wight, Great Britain, thanking Hall-Scott for their "brotherly kindness."

SOMETHING entirely new in Salvage vessels, the *Lincoln Salvor,* is nearing completion at the Bellingham Marine Railway and Boatbuilding Co., Bellingham, Washington. Containing over 500,000 feet of lumber, she is powered by Cooper-Bessemer Diesels, her four main engines being direct connected to generators which supply current to General Electric propulsion motors.

POWERED with four cylinder, 10 in. x 10 in. Kahlenberg Diesels, the Vic Frank Boat Co., of Seattle, Washington, has launched the first of its allotment of 65-ft. freight and passenger boats for the Army's use in northern waters. Six more are to follow.

BUILT in 1890 as a cannery tender, converted to freight service, then to a towboat in 1922 with her first Washington Diesel, the *Elmore* of the American Tugboat Co., Ballard, Washington, is now receiving her second Washington Diesel, a 240 hp. unit for more power and lugging capacity.

INSTALLATIONS of Gray marine Diesels are not uncommon on the West Coast, and they have been installed in boats built in some unusual places. The latest and an unusual installation of Gray Marine Diesels is that of the Army utility boat *Q-86* built at McNeil Island, Washington, in the prison workshop by federal penitentiary inmates.

THE British Columbia Pulp and Paper Company's towboat *A-One,* Vancouver, B. C., has new power in the form of a Buda marine Diesel equipped with 3 to 1 Twin Disc reduction gears and rated 100 hp. at 1,100 rpm.

THE well-known San Diego, California, sportfishing vessel *Sportfisher II* is having a new 6-cylinder, 235 hp. Buda Diesel installed by the Crofton Engine Co., also of San Diego. Auxiliaries are 30 hp. Lister Diesels.

FISHER Bros. Co., Caterpillar dealers of Astoria, Oregon, report the sale of a marine Diesel with 2 to 1 reduction gear to Captain Dave Coe, of Port Blakely, Washington, for installation in his fishboat *Julia* of the Columbia River fleet.

SUN Harbor Packing Co., San Diego, is reported to have purchased a 200 hp. Superior Diesel for installation as standby power in its cannery. This power unit will be direct connected to 135 kw. generator and will be thrown on the line in case of power failures.

THE Shepherd Tractor and Equipment Co., Los Angeles, California, report the sale of two 6-cylinder Caterpillar Diesels to a West Coast shipyard for installation in troop transport to handle fire pumps.

TO be powered with a 200 hp. supercharged Cummins Diesel with Twin Disc reduction gears, Captain John Ghio's new 65-ft. fish boat is under construction by Campbell Machine Co., San Diego.

THE Hodgson-Greene-Haldeman Co., Shipbuilders, Long Beach, California, last month completed its last commercial vessel. This was the *Sea Lion*, 91-ft. fishing boat for the French Sardine Co., San Pedro. Her main engine is a 300 hp. Superior Diesel; auxiliaries are two 100 hp. Superior fresh water cooled Diesels. Pumps and motors are by Fairbanks-Morse. Yard is now all-out on defense work.

A MACK Diesel rated 100 hp. at 1500 rpm., with 3 to 1 reduction gear, fresh water cooling system and power take-off, has been installed in the Gulf of Georgia Towing Company's tug *Gaff*. This British Columbia towboat swings a 38-in. wheel and is used in harbor service.

THE former steam driven stern-wheeler *Ora Elwell* owned by the Skagit Towing Co., Mount Vernon, Washington, has been converted with twin 60 hp. Atlas Imperial Diesels and Twin Disc gears.

A RECENT repowering job was that of *Victory Bay*, a 62-foot cannery tender owned by Francis Millard and Co., Vancouver, B. C., with a 6 cylinder, 100 hp., Mack marine Diesel with 8 to 1 reduction gear.

KEANE Lines, operating a fleet of freighters in Mexican waters, has purchased a Caterpillar Diesel for installation on one of its vessels. This will handle cargo loading gear.

Burlington Instrument Corp. Announces A New Small Voltage Regulator

A SIMPLIFIED small size voltage regulator has been announced by Burlington Instrument Corporation. This new voltage regulator is characterized as simple in construction, light weight, and giving smooth, close regulation. It is especially suited to portable generating units and meets radio interference and regulations of the Signal Corps and Radar.

The unit weighs ten pounds and measures 9 inches high, 6½ inches wide, and 4½ inches deep. Write direct to Burlington Instrument Corp., Burlington, Iowa, for Bulletin GL-1.

Editorial Index Available

A COMPLETE editorial index of all issues of DIESEL PROGRESS published in 1942 has been prepared. The index is conveniently arranged by titles and subjects and is now available without charge upon written request. Address Diesel Engines, Inc., 2 West 45th St., New York, N. Y.

New Combination Soluble Oil Announced by Standard of Indiana

DEVELOPMENT of a new heavy duty soluble oil which will help speed war production and reduce costs by providing with one oil the finish, tool life, and cooling that formerly required more than one is announced by Standard Oil Company of Indiana.

War plants have many jobs which normally require a cutting oil to give high finish and long tool life, but for one reason or another they also demand the maximum cooling usually obtainable only with a water emulsion type coolant. As a result of Standard's work, such war specifications can now be met with the one heavy duty soluble oil.

The new product contains an effective amount of special compounding other than that required to give good emulsion characteristics, according to the company. It is stable in storage, mixes easily, does not gum machines or work, possesses good anti-rust properties, is non-injurious to workman's hands, and is not susceptible to odor development. In addition, it has no harmful effect on machine lubrication where used as recommended by the manufacturer's cutting oil engineers.

The G.E. 1942 Marine Equipment Review Says . . .

DIESEL-ELECTRIC drive became more firmly established in the war program. Such propulsion equipments were being produced during the year at a rate 50 per cent over the record year of 1941. There was a definite trend toward direct motor drive; in more than half of the vessels the propulsion motors were connected directly to the propeller shaft, thereby eliminating the need for gears.

In all of the vessels the controls were so arranged that at least half of the electrical power generated can be made available for auxiliary purposes, an outstanding feature of Diesel-electric drive which warrants its use in many classes of vessels.

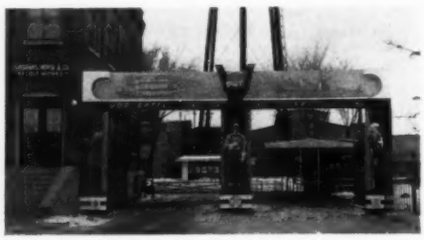
Production of submarine propulsion equipment was increased approximately 100 per cent.

Fairbanks-Morse Honor War-Workers

AT THE Beloit Works of Fairbanks, Morse & Company a signal honor was recently bestowed upon the company's many thousands of war-workers who have been striving hard to produce as many Diesel engines, pumps, motors and other equipment as is humanly possible for the armed forces.

Attractive displays were installed at the three main gates of the big plant featuring an Army man on the left of the entrance, a Sailor on the right and an F-M factory-worker in the center. The two men of the Army and Navy are shown standing at attention saluting the central figure of the war-worker indicative of the honor shown by the armed forces to those whose uniforms are blue denim or overalls.

Above the three nine-foot figures is the slogan, "Our battle line is the production line," in cut-out electric lights. A "V" for Victory in neon lights with a row of Diesel engines on one side and a number of submarines on the other, tops the entire display which is some thirty-five feet wide.



South Central Gate with "Victory" Sign—Beloit Plant

According to A. C. Howard, General Manager of the Beloit, Wisconsin, Works, the patriotic display has been well received by the company's employees. The displays were conceived by Henry J. Barbour, Manager Sales Promotion, and constructed by General Exhibits and Displays, Inc., of Chicago.

Maritime "M" Award to Cooper-Bessemer Recognizes Outstanding Engine Production

FITTING tribute to the Grove City, Pa., plant of The Cooper-Bessemer Corporation for its outstanding production of Diesel engines and major engine parts for Liberty Ships was noted in December with the presentation to this 109-year-old engine builder of the Maritime "M", highest award of the United States Maritime Commission.

Admiral H. L. Vickery presenting the Maritime "M" pennant to Gordon Lefebvre, vice president and general manager of Cooper-Bessemer Corporation.

Significance was added to the ceremony in the person of Rear Admiral Howard L. Vickery, Vice-Chairman of the U. S. Maritime Commis-

sion and Chairman of the Board of Awards, who made the presentation of the "M" award. Admiral Vickery honored Cooper-Bessemer workers who were cited for their sustained, top-speed production of such critical equipment for ships of the United Nations.

The high degree of friendliness and cooperation existing between workmen and managers at both the Grove City, Pa., and Mount Vernon, Ohio, plants of the corporation was well expressed by Gordon Lefebvre, Cooper-Bessemer vice-president and general manager, who accepted the award for the organization. Other high points of the program, which was carried by direct wire through loud speakers to workmen assembled at the Mount Vernon headquarters and also broadcast over radio stations in Pennsylvania and Ohio, included raising the Victory Fleet Flag and the Maritime "M" burgee, and presentation of the Maritime Merit Badge for each Cooper-Bessemer employee.

General view of the Speakers' Platform at Cooper-Bessemer Maritime "M" ceremonies.

The event was said to have been particularly timely in that it gave special recognition to the tremendous advances made in Diesel engineering, and pointed out the vast extent to which Diesel engines have been applied in the shipping industry, before and during the present global war. Not only have Diesels affected naval power in World War II, but their influence is being felt in practically all phases of military strategy.

Such Diesel advantages as exceptional maneuverability and smokeless operation make today's ships less susceptible to sea or air attack and to some extent have been responsible for the ever increasing volume of Diesel engines being supplied for the huge fleets of Allied cargo vessels and fighting ships.

The remarkable power and efficiency of Diesel engines has also been proven on the world's battlefronts where trucks, tanks and other mobile equipment are setting the fast pace of present day warfare.

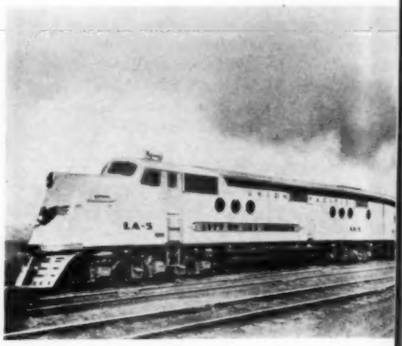
One Thousandth of an Inch Of Wear in a Million Miles of Service

A STRIKING example of the value of hardening metal by electrical induction was recently demonstrated when the vital parts of one of the world's fastest "streamliners" was inspected after the locomotive had piled up a million miles of service.

In checking the engine parts, the wear on the crankpins was found to be only .001 inch—hardly enough to measure—even though the train had traveled a distance equivalent to forty times around the world!

In order that the crankshaft may stand up under the tremendous pressure exerted by the locomotive's 12 cylinder, V-type, Diesel engine, the surfaces of the bearings and crankpins were selectively hardened by the TOCCO process providing accurate control of depth, width, and structure of the hardened area.

In commenting upon wearability of the streamliner's crankshafts, Dr. H. B. Osborn, Jr., TOCCO Research Engineer, emphasized the fact that since surface hardening by electric induction was first proven so successful for hardening bearing surfaces on crankshafts and camshafts for Diesel engines and automotive engines, it was only natural that the same process be used for hardening scores of wear products.



Although the equipment used to harden huge locomotive crankshafts is somewhat different from that used to harden smaller parts such as, armor piercing shot, sprockets and track pins, the process is essentially the same.

Crankshaft of the type that have set new records for long life and wearing qualities are usually hardened in a tunnel line type of TOCCO equipment with the necessary TOCCO generator, control board, etc.

"Get Harry Hansen"

"GET HARRY HANSEN!" is a well-known phrase from one coast to the other—whenever a question arises regarding Diesel engines. By his capacity of Supervising Erecting Engineer of the Enterprise Engine & Foundry Company he checks every important installation and is on hand for all trial trips in which Enterprise Diesels are under test run. He has a long standing reputation throughout the country as the "A-1" Trouble Shooter on Diesels.

Starting in true American tradition—right at the bottom of the ladder, Mr. Hansen began his career twenty years ago as a mechanic with Enterprise Engine & Foundry Company. With a splendid mechanical background and basic field experience, he soon rose to the rank of foreman and before many years had passed he became a recognized authority on Diesel engines.

Back in 1920, Mr. Hansen supervised the first Diesel job on the coast. It was a cumbersome Hvide System of Injection installed on the boat *Frank Nordlund* in Seattle. This engine weighing thirteen tons produced but 100 hp. The bulky slow type of earlier years has been supplanted by today's fast, light-weight heavy duty engine.

Harry Hansen

There isn't a navy yard in the country where Mr. Hansen's name is not familiar. Known from coast to coast, from the Great Lakes to Cuba, Mr. Hansen's ability to solve the knotty problems of Diesel engineering has gained for him a noteworthy recognition. As head of the Service Engineers of Enterprise Engine & Foundry Company, Mr. Hansen's knowledge gained from constant contact with customers on their boats has been of immeasurable value to the Enterprise Company in perfecting its Diesel engines.

New Tulsa Agency for Blackmer Pumps

THE appointment of the Power Machinery Company, of which Mr. Egon Koehler is president, as Blackmer Pump sales representatives in Oklahoma and western Arkansas has been announced by J. B. Trotman, General Sales Manager of the Blackmer Co. at Grand Rapids.

Mr. Koehler is a mechanical engineer, a graduate of Texas A. & M. College, and has been active in the equipment field for more than twenty years. His company maintains offices at 215 North Detroit Street, Tulsa, and operates a branch in Houston, Texas, 2015 Second National Bank Building, in charge of F. F. Dietterich. E. P. Kirchhofer is manager of the service department at Tulsa. Power Machin-

ery Company is an engineering sales organization specializing in pumping problems. They also distribute a general line of machinery and equipment.

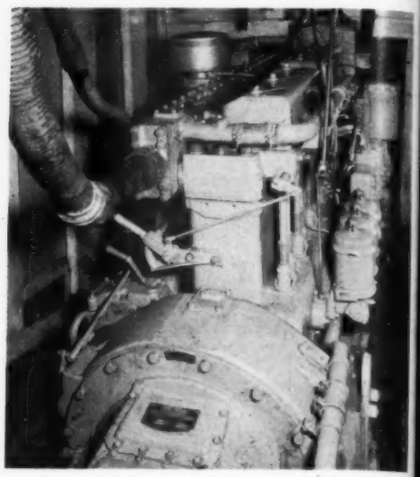
"Christe" Goes Diesel

A RECENT installation of interest to the work boat owner is a 6-cylinder, 5⅜ in. by 8 in. Caterpillar marine Diesel, rated at 100 hp. at 900 rpm., in the 45-ft. northern-built halibut-type fishing boat *Christe* which, because of the war, is now operating in Southern California waters out of San Pedro harbor.

The Diesel is fresh water cooled through heat exchanger; has 3 to 1 reduction gear turning a 43 in. by 28 in. special wheel which gives

DIESEL PROGRESS

the craft a neat nine knots. Starting is by built-in gasoline engine and power take-off is provided for handling net lines.



Engine room of "Christe." Note Twin Disc gears; Burgess intake air filter; automatic steering gear over Caterpillar Diesel.

An unusual feature of this repower job is the installation of a photo-electric automatic steering gear that releases the owner-brothers, Arthur and Harold Johnson, for other duties while under way and while handling the boat's heavy shark gear.

Additional list of items, including equipment, includes: Twin Disc gears; Coolidge wheel; Burgess intake air filter; Kettell vacuum type exhaust silencer; Caterpillar heat exchanger and fuel-lube filters.

Fuel capacity is 400 gallons, with engine consumption five gallons per hour at full throttle.

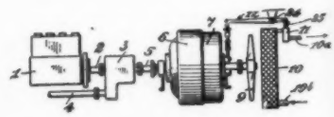
2,289,440
COOLING DEVICE FOR INTERNAL COMBUSTION ENGINES

Fritz Kugel, Heidenheim-on-the-Brenz, Germany, assignor to American Voith Contact Company, Inc., New York, N. Y., a corporation of New York.

Application September 26, 1940, Serial No. 358,513

In Germany September 23, 1939

3 Claims. (Cl. 123—174)



2. In a cooling system, in which a cooling fan is driven by an engine through the intermediary of an hydraulic coupling, the combination therewith of means for varying the amount of fluid in the coupling, dependent upon and changing with the amount of the cooling required by the engine, said means consisting of a scoop tube within the coupling for returning discharged fluid to the operative circuit of the hydraulic coupling, and a device responsive to the temperature of the cooling fluid of the engine for controlling position of scoop tube.